THE PAPER INDUSTRY and PAPER WORLD

EDUCATIONAL NEWS MAGAZINE — JANUARY, 1944

CHNOLOGY DEPT.

PUBLIC LIBRARY

1944

DETROIT

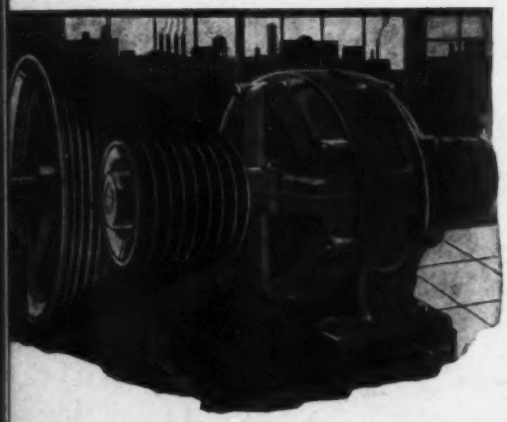
OWNINGTOWN

V-BOARD DESIGNED FOR WARTIME NEEDS DESTINED FOR PEACETIME USES

Early in the war, thousands of tons of food and equipment were made useless, after thousands of mile in transit, because of moisture penetration, insect infestation, rust, breakage, and climatic extremes. This was because the ordinary corrugated container, so satisfactory for domestic shipments, proved useless in protecting shipments made abroad. . . . The Weatherproof Box Group of mills went back to work and developed V-Board to solve the problems of wartime shipping needs. It has proved so successful that many manufacturers claim that after the war they will not even go back to wood for shipping cases. We predict many others will learn about V-Board and will use it. . . . Practically every mill in the country that can make V-Board is now doing so. We don't know who made the V-Board used in the boxes shown in this picture, but we do know that with the aid of Downingtown Machinery, our customers listed in the "V" are equipped to do so. . . . Performance of Downingtown Machinery under the stress of wartime conditions is something for every paper and board mill to remember, or investigate, before ordering post-war equipment. Our Engineering Department is at your service NOW. Downingtown Manufacturing Company, Downingtown, Pa.

With the Rockwood automatic belt tightening motor base the belt tightness matches the load—increasing automatically when the load increases—slacking off when the load lessens.

ROCKWOOD *automatic belt tightening* MOTOR BASES



Belt life of multiple V-belts is practically doubled and the drive efficiency sharply increased when the V-belts are kept tight automatically with Rockwood Pivoted Motor Bases.

When you install a Rockwood automatic belt tightening motor base *you improve that drive for many years—for the entire life of the driven machine.*

Rockwood Bases pay for themselves so quickly—usually in 6 to 12 months—that for many years you have the benefit of the saving that results from the resulting better machine performance.

Machine output is increased—belt slip eliminated—and you have less maintenance. The action of the motor base is automatic and the belts last nearly twice as long.

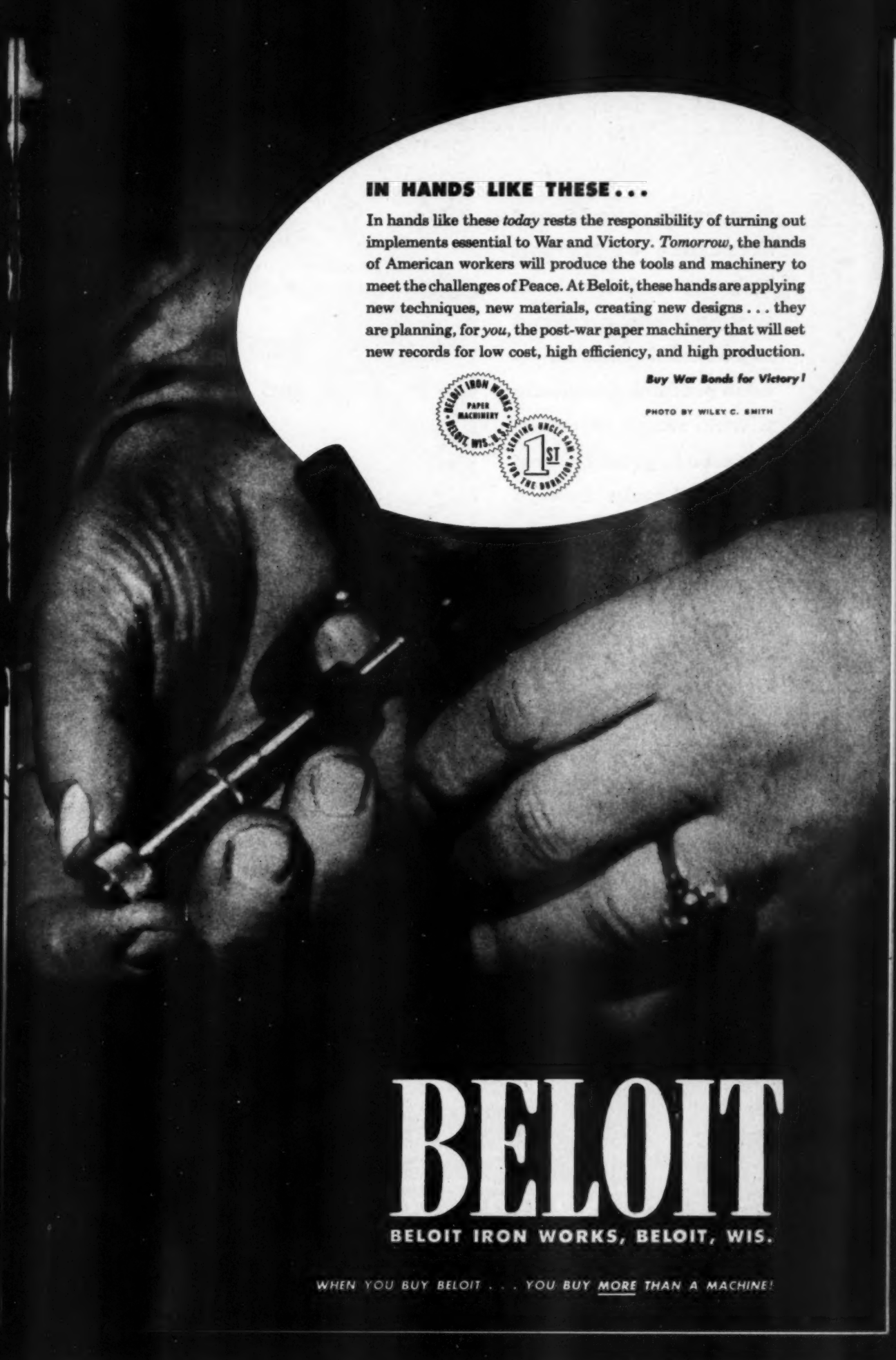
Rockwood Bases are installed in hundreds of paper and pulp mills—on drives to barkers, chippers, beaters, pumps, lineshaft drives to paper machines—and a long list of other uses.

WHEREVER YOU HAVE A BELTED ELECTRIC MOTOR YOU CAN USE THE ROCKWOOD AUTOMATIC BELT TIGHTENING MOTOR BASE. *A belted motor with short center flat or V-belts is not modern without one.* Write for details if you are interested.

ROCKWOOD

INDIANAPOLIS • U.S.A.

Specialists in Power Transmission Equipment Since 1884


IN HANDS LIKE THESE...
In hands like these *today* rests the responsibility of turning out implements essential to War and Victory. *Tomorrow*, the hands of American workers will produce the tools and machinery to meet the challenges of Peace. At Beloit, these hands are applying new techniques, new materials, creating new designs . . . they are planning, for *you*, the post-war paper machinery that will set new records for low cost, high efficiency, and high production.
Buy War Bonds for Victory!
PHOTO BY WILEY C. SMITH
BELOIT IRON WORKS
PAPER MACHINERY
BELOIT, WIS., U.S.A.
SERVING UNCLE SAM
1ST
FOR THE DURATION
BELOIT
BELOIT IRON WORKS, BELOIT, WIS.
WHEN YOU BUY BELOIT . . . YOU BUY MORE THAN A MACHINE!

The grain, grade and structure of Norton Pulpstones have been designed and arranged to be flexible and adapted to producing not only a wide range of pulps, but also to grind the best grade of pulp from a wide variety of woods.
NORTON
WHEN IT'S AN ABRASIVE PROBLEM, CALL IN NORTON ENGINEERING SERVICE
NORTON COMPANY
WORCESTER, MASS.

Stuffed Shirts

SHIRTS not by the box, but by the bale. Soldiers' shirts and other clothing wrapped in *waterproofed paper* for floating to the beach in an emergency from ships lying offshore.

Producing paper for special wartime as well as civilian uses in the face of the manpower and material shortage requires maximum machine efficiency, and to assure it mills everywhere are lubricating their equipment with Texaco.

For example, *Texaco Crater* cushions load shocks, stops undue wear, quiets the noise of large open gears. Crater doesn't ball up, channel or throw off, but clings to tooth surfaces, following through from gear to gear, despite heavy pressure, high temperatures and peripheral speeds.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States.

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ *More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.*

★ *More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.*

★ *More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.*

★ *More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.*

★ *More revenue airline miles in the U. S. are flown with Texaco than with any other brand.*

TEXACO

TEXACO Lubricants

FOR THE PAPER INDUSTRY

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

WANTED: *new fields to conquer*

SODIUM CHLORITE: A product of Mathieson Research!

A powerfully efficient oxidizing agent – easily controlled – that operates effectively over a wide range of conditions from highly acid to highly alkaline.

Sodium Chlorite does the job you want done – and only that!

In years an infant, in accomplishments a prodigy – Mathieson Sodium Chlorite has made vital contributions in manufacture and processing:

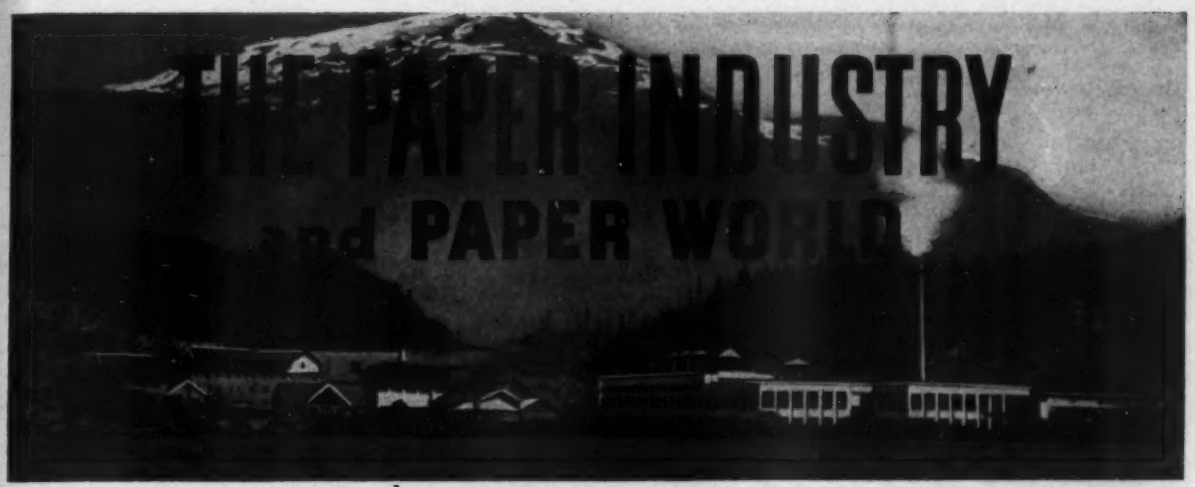
- oxidization of vat dyes in textile field.
- bleaching of cotton without danger of degradation.
- bleaching cellulose acetate – no saponification hazard.
- simultaneous scouring and bleaching of cotton-rayon mixtures.
- bleaching paper pulp to exceptional, high brightness with superior quality.
- refining and bleaching sugar and sugar melts at lower costs with increased recoveries.
- speeding the bleaching of waxes.

And now, Mathieson Sodium Chlorite wants new fields to conquer. For we can pound the stimulus but you must fire the mold. So here it is – complete information is yours for the asking.

Mathieson Sodium Chlorite

THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42ND ST., NEW YORK 17, N. Y.

SODIUM CHLORITE PRODUCTS . . . CAUSTIC SODA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . AMMONIA, ANHYDROUS & AQUA . . . HTH PRODUCTS . . . FUSED ALKALI PRODUCTS . . . SYNTHETIC SALT CAKE . . . DRY ICE . . . CARBONIC GAS . . . SODIUM METHYLATE



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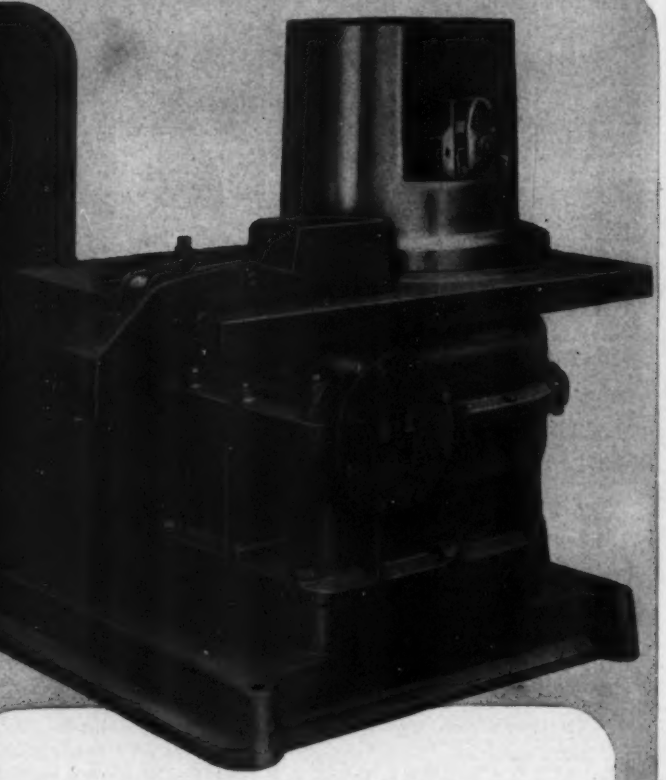
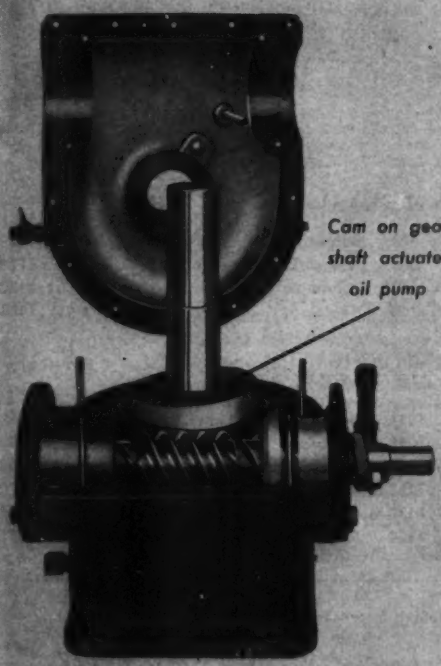
Carrying Overhung Loads





Cam on gear shaft actuates oil pump

This *De Laval Worm Gear* is an integral part of an improved wire-drawing machine.

The "bull block" upon which the wire winds as it comes from the die is mounted directly upon the worm-gear shaft, the amply proportioned and positively lubricated bearings of which take the pull of the wire.

The 1150 r. p. m. motor is to be mounted upon the extended base plate and coupled directly to the worm shaft, the gear ratio being 29½ to 1.

Vertical drive worm gears can be arranged with the gear shaft extending either up or down, and for any ratio up to 8000 to 1, double reductions being used for ratios over 100 to 1.

1139

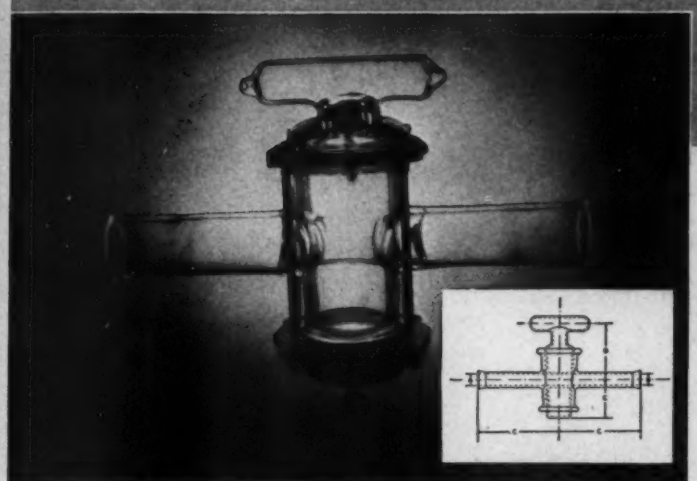
DE LAVAL

WORM GEAR DIVISION

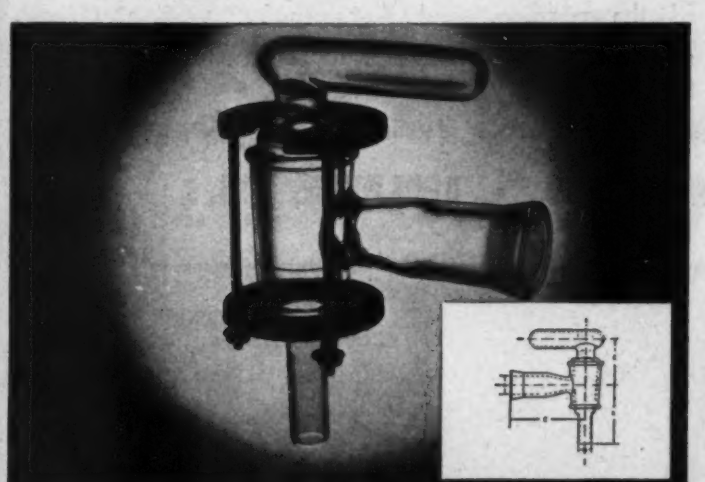
of the De Laval Steam Turbine Co., Trenton 2, N. J.

MANUFACTURERS OF TURBINES · STEAM HYDRAULIC PUMPS · CENTRIFUGAL COOLERS · ROTARY DISPLACEMENT · MOTOR MOUNTED · MIXED FLOW PROPELLER · PRIMING SYSTEMS · TURBO-AIR WIPE · WORM GEARS · FLEXIBLE COUPLINGS

How to use valves in Pyrex pipe lines



Pyrex plug type valve available in 1″ and 1½″ sizes. Used as standard flange, glass pipe fittings.



Pyrex spigot type valve for use in 1″ line, designed primarily for use as terminal outlets.

The use of PYREX Piping is in no way limited by inability to insert valves in the lines. PYREX brand Glass Valves are available in 1″ and 1½″ sizes. When valves are needed for the 2″, 3″, and 4″ lines, standard adaptor fittings are available to connect PYREX Piping directly to valves made of the following materials:

STEEL	PORCELAIN
CAST IRON	GLASS-LINED METAL
LEAD	HARD RUBBER
STAINLESS	RUBBER-LINED-METAL

PYREX brand Glass Valves are ideally suited for use in 1″ and 1½″ lines. They are particularly qualified to handle dilute mineral acids, pharmaceutical preparations and distilled water. Like Pyrex Piping, they have the advantages of remarkable chemical stability, resistance to thermal shock, and transparency which reveals the contents at all times.

Consequently, you need not do without the advantages of PYREX Piping because valves present a problem. Corning engineers will gladly assist you in selecting the proper valve and installing them. Write to Industrial Division, Dept. PI3 Corning Glass Works, Corning, N. Y.

VALVE SPECIFICATIONS

SIZE	STYLE	NORMAL DIMENSIONS A	B	C	D	E
1″	Spigot	1″	11/32″	4⅛″	2 3/16″	3¼″
1″	Plug, Straight	1″	1″	7″	4¾″	3¼″
1½″	Plug, Straight	1½″	1½″	7″	4¾″	3¼″

Corning Glass Works, Industrial Division, Dept. PI3
Corning, New York

Gentlemen:
I would like glass piping information immediately on the subject I have checked below. I understand there is no obligation.

- ☐ Valves
- ☐ Pyrex Piping and Heat Exchangers
- ☐ Installation Manual
- ☐ Adaptors

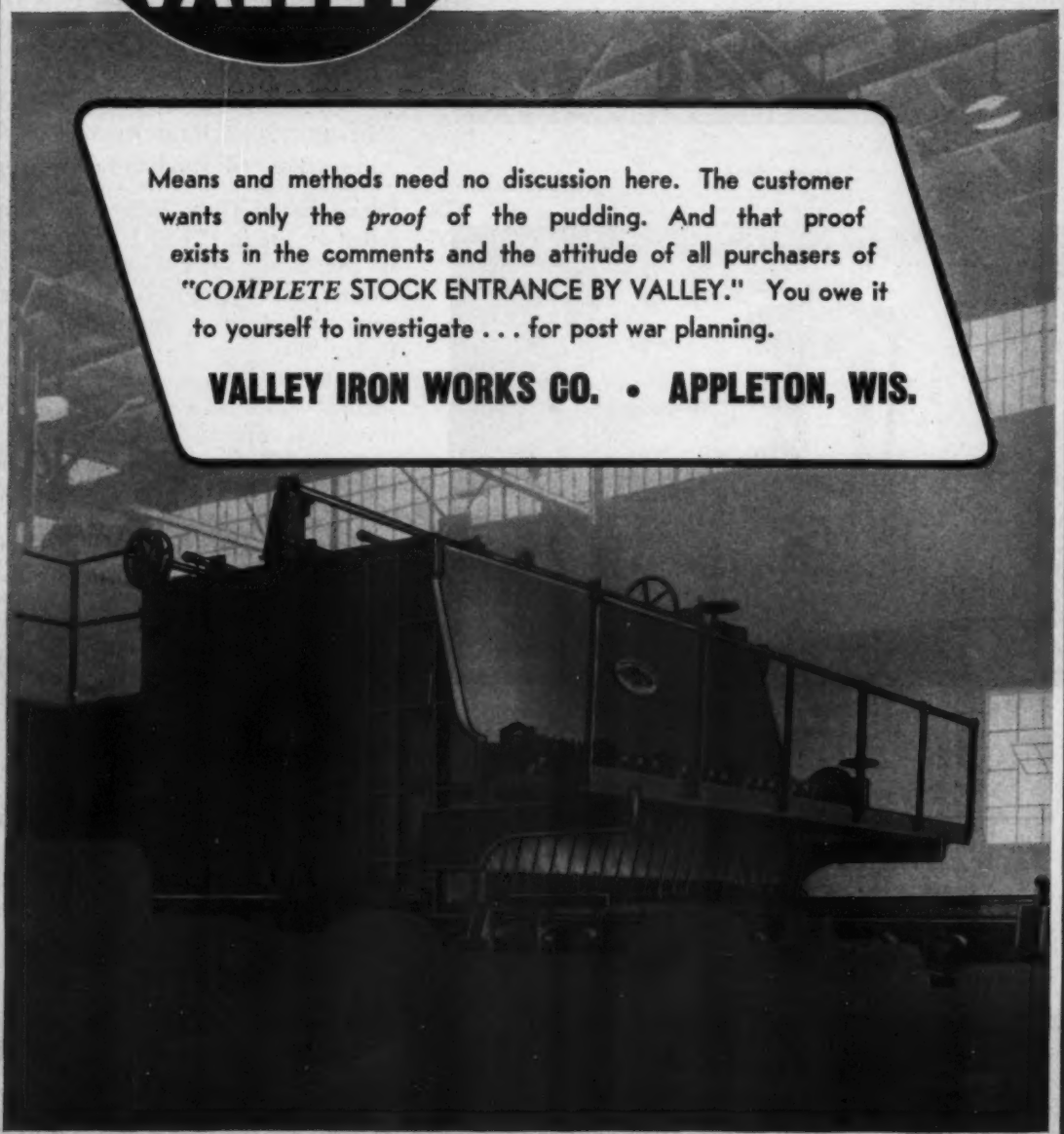
Name.....
Firm.....
Street.....
City and State.....

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

CORNING
Glass Works
Corning, New York

Pyrex Industrial Glass

ANOTHER
EXAMPLE OF
Complete
Stock Entrance
BY
VALLEY



Means and methods need no discussion here. The customer wants only the *proof* of the pudding. And that proof exists in the comments and the attitude of all purchasers of "*COMPLETE* STOCK ENTRANCE BY VALLEY." You owe it to yourself to investigate . . . for post war planning.

VALLEY IRON WORKS CO. • APPLETON, WIS.

a few of the Goulds pumps built for U. S. Landing Craft

Official U. S. Signal Corps Photo

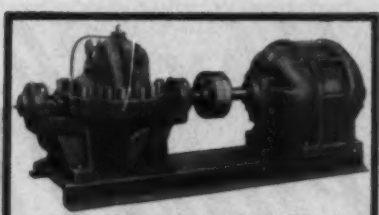


Fig. 3380—2 Stage Centrifugal

Fig. 3640—1" "Close-Cupld" Centrifugal

Dual Fig. 3620 Centrifugal and Fig. 1942 Rotary

. . . . . BUT WE'RE STILL BUILDING PUMPS

This is a frank statement of facts.

Our nation is at war. The very principles upon which this great country of ours were founded are in peril. Our first duty—yes, our foremost desire—is to render every possible aid we can, as a company and as individuals, to the government whose responsibility it is to see this war through to a successful finish in just as short a time as possible.

We have been supplying pumps for the armed services in ever increasing quantities since before Pearl Harbor. Right now, certain shipbuilding programs of the Navy are particularly urgent. Schedules have been stepped up to such an extent that a large share of our facilities are devoted to the production of such pumps as are a vital part of the program. That we have the facilities, that the government has confidence in our ability to produce their requirements on schedule, is gratifying to us. We would not have it otherwise.

We realize, however, that this situation is proving a hardship to our regular customers—customers, who in many cases, have been buying their pumps from us for years. Their need for pumps is undoubtedly urgent but this is war and our first responsibility is to our fighting men. Whatever facilities we have available, beyond the needs of these extremely urgent programs, are at the disposal of our customers for priority orders. As these facilities permit, we will endeavor to the best of our ability to take care of their pump requirements, making the best possible delivery we can under these difficult conditions.

But we *are* still building pumps . . . and pumps alone. That means we are going to have no conversion problems when the fighting is over. We are acquiring valuable experience in volume production and improved designs. After the war, we will be in a better position than we have ever been in all our 96 years to serve our regular customers with better equipment, a broadened knowledge of pumping problems and to give improved deliveries.

Until that day, we can only ask you to bear with us as far as possible . . . and to remember that Goulds still builds "*the* pump for *the* job."

Goulds PUMPS, INC.

SENECA FALLS, NEW YORK

Why the **MP** *in this* *POWELL VALVE ad?*

Well—you know what "Military Police" signifies, don't you? It's the designation of specially qualified, specially fitted men who are charged with the duty of seeing that "things run smoothly." One of their most important functions, wherever troops and supplies are located, is to *control the flow* of traffic.

So—that "M P" is in this advertisement because he signifies the thorough-going job performed by POWELL VALVES in every branch of industry—in *controlling the flow* of liquids and gases—often under the most exacting conditions.

The Wm. Powell Co.
Dependable Valves Since 1846
Cincinnati 22, Ohio

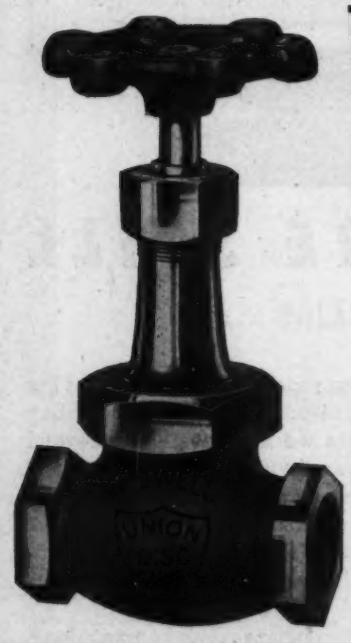


Fig. 150—Bronze "Union Disc" Globe Valve for 150 pounds W.P. Screwed ends, union bonnet, and renewable vulcanized composition disc—especially adapted for throttling service—for the control of low-pressure steam, oil, water, gas, etc.

Fig. 500—125-pound Bronze Gate Valve with screwed ends and screwed-in bonnet. Sizes ¼" to ¾" equipped with taper wedge solid disc; sizes 1" to 3" with taper wedge double disc.

POWELL VALVES

Backed by a World of Experience

For more than 60 years we have been producing mechanical rubber goods. Our technical experts are constantly at work finding new ways to use the materials at our command and to improve quality.

Currently, working with synthetics as well as crude and reclaimed rubber, BWH developments from war's demands are accruing which will make BWH post-war products surpass the finest the world knows so well today.

BOSTON WOVEN HOSE & RUBBER CO.

WORKS: CAMBRIDGE, MASS., U. S. A. P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

BOSTON WOVEN HOSE AND RUBBER COMPANY

LOOK FOR THIS MARK of QUALITY ON Felts

Appleton Felts

MAKE GOOD PAPER

APPLETON WOOLEN MILLS

APPLETON, WIS.

Check List OF MONSANTO PLASTICIZERS

. . . to help you make the most efficient use of available supplies!

With supplies of plasticizers short of wartime needs it is essential that the most efficient possible use be made of every available pound.

That's why it is suggested that you review the Monsanto plasticizers you are now using to make certain they are the best possible materials available for your needs.

A quick glance at this table of the principal Monsanto Plasticizers will give you a preliminary check. A letter will bring you the help of a Monsanto technical service representative in making a final decision. Write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, St. Louis, Missouri.

CHARACTERISTICS OF MONSANTO PLASTICIZERS

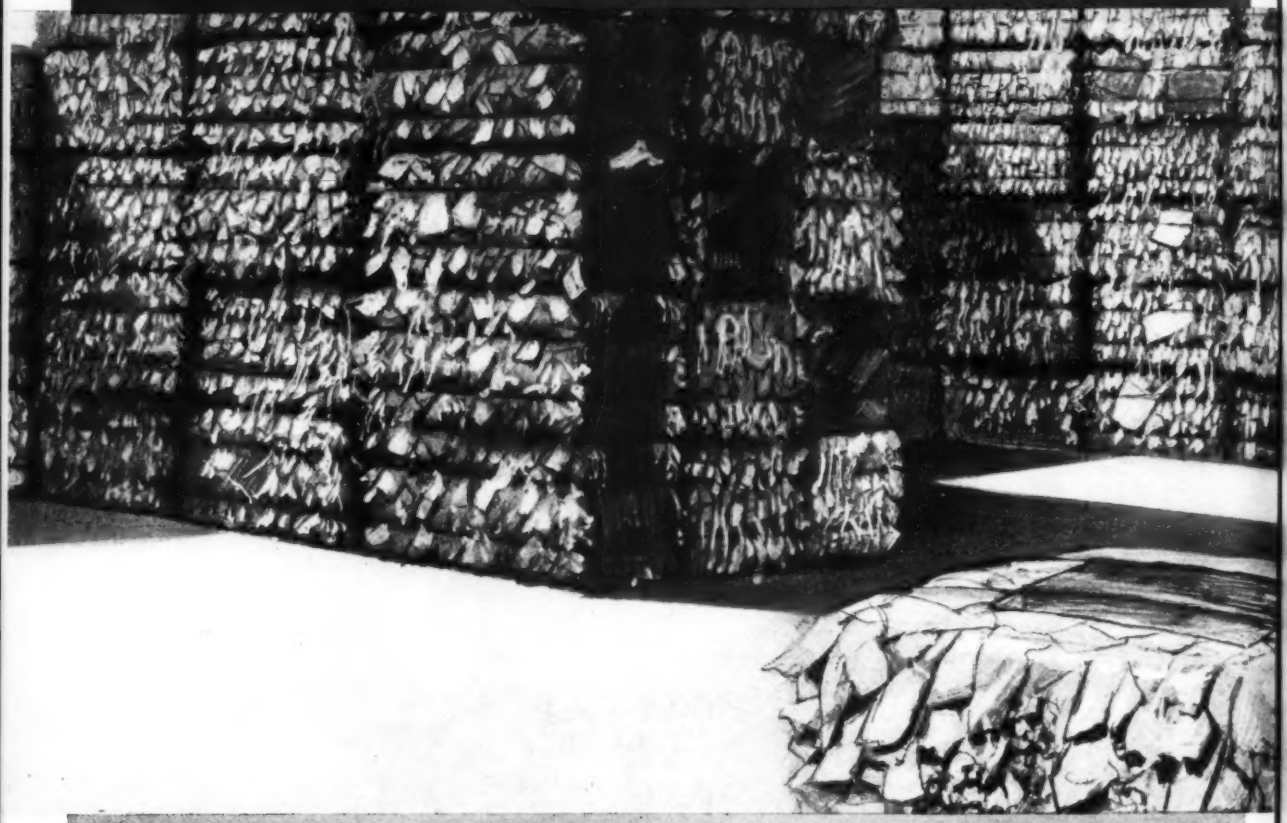
	Mol. Wt.	Color and Form	Boiling Point	Cryst. or Melt. Point	Sp. G.	Lbs. per Gal.	Refrac. Index	Evap. Rate Gms./sq.cm/hr/ 100°C	Solubility in Water	Retentivity in N/C	Retentivity in Ac/C	Light Fastness in N/C	Light Fastness in Ac/C	USES
Tricresyl Phosphate	368	Colorless liquid	295°C/13 mm	Non-cryst., solid at −35°C	1.165/20°C	9.7	1.556/20°C	0.00000708	Less than 0.002% at 85°C	100 plus	0	Poor	—	Excellent compatibility with most resins and plastics except cellulose acetate; imparts excellent flexibility with a minimum decrease in tensile strength; excellent fire retarding properties.
Triphenyl Phosphate	326	White flakes	245°C/11 mm	48.5°C	1.268/60°C	10.5	———	0.00000028	0.001% at 34°C 0.002% at 34°C	100	80	Poor	Fair	Standard fire retarding plasticizer especially for cellulose acetate; gives clear tough compositions of good flexibility without tackiness.
Santicizer 8	199	Light amber liquid	———	———	1.188/25°C	9.9	———	0.0002659	0.13% at 25°C 0.213% at 48°C	100	90	Poor	Good	Excellent plasticizer for cellulose acetate, giving brilliance and polish; valuable plasticizer for coating designed to withstand petroleum products; increases flexibility of shellac and protein plastics.
Santicizer 9	171	White granules	———	105°C	1.313/25°C	10.9	———	0.000053 at 65°C	1% at 34°C	25–30	25–30	Poor	—	Imparts gloss; gives smooth working and uniform curing of molded phenolic and urea resins; blends readily with most synthetic resins; does not impart softening action of liquid plasticizers.
Santicizer B-16	336	Colorless liquid	219°C/5 mm	Below −35°C	1.097/25°C	9.15	1.490/25°C	0.0000881	0.0012% at 30°C	100	20–30	Excellent	Excellent	With nitrocellulose, gives clear, brilliant films that are flexible, tough, moisture resistant and have good weathering qualities; solvent for and imparts plasticity to most synthetic resins. Non-toxic.
Santicizer E-15	280	Colorless liquid	190°C/5 mm	20°C	1.180/25°C	9.84	1.498/25°C	0.0001106	0.0175% at 30°C	100	100	Excellent	Excellent	With both acetyl and nitrocellulose, it gives clear, tough flexible films that have much increased resistance to moisture penetration. Non-toxic.
Santicizer M-17	266	Colorless liquid	189°C/5 mm	Below −35°C	1.220/25°C	10.2	1.504/25°C	0.000221	0.09% at 30°C	100	100	Excellent	Excellent.	Imparts high degree of permanent plasticity; excellent gasoline resistance. Non-toxic.
Dibutyl Phthalate	278	Colorless liquid	206°C/20 mm	−35°C	1.047/20°C	8.75	1.490/25°C	0.000221	0.001% at 30°C	100	Less than 20	Excellent	—	A standard lacquer plasticizer giving high degree of plasticity; excellent light stability and good weathering qualities.
Diethyl Phthalate	222	Colorless liquid	295°C	−0.3°C	1.123/20°C	9.35	1.503/20°C	0.000617	0.058% at 30°C	100	100	Excellent	Excellent	Generally used in mixture with Dimethyl Phthalate as a plasticizer for cellulose acetate.
Dimethyl Phthalate	194	Colorless liquid	282°C	0°C	1.196/15.6°C	10.0	1.515/20°C	0.001925	0.4% at 32°C 0.6% at 63°C	100	100	Excellent	Excellent	Standard cellulose acetate plasticizer generally used in mixtures with diethyl phthalate or other plasticizers.
Diphenyl Phthalate	318	White powder	———	69°C	1.28/25°C	10.68	1.572/74°C	———	Insol.	65	20	Poor	—	Compatible with nitrocellulose and with the sulfonamide, phenolic, polystyrene and vinyl types of resins; gives increased water resistance to all compositions in which it is used.

Tricresyl Phosphate and Triphenyl Phosphate have excellent Fire Retardation.

MONSANTO CHEMICALS

The Nation Has Ruled Out the Waste from

WASTEPAPER

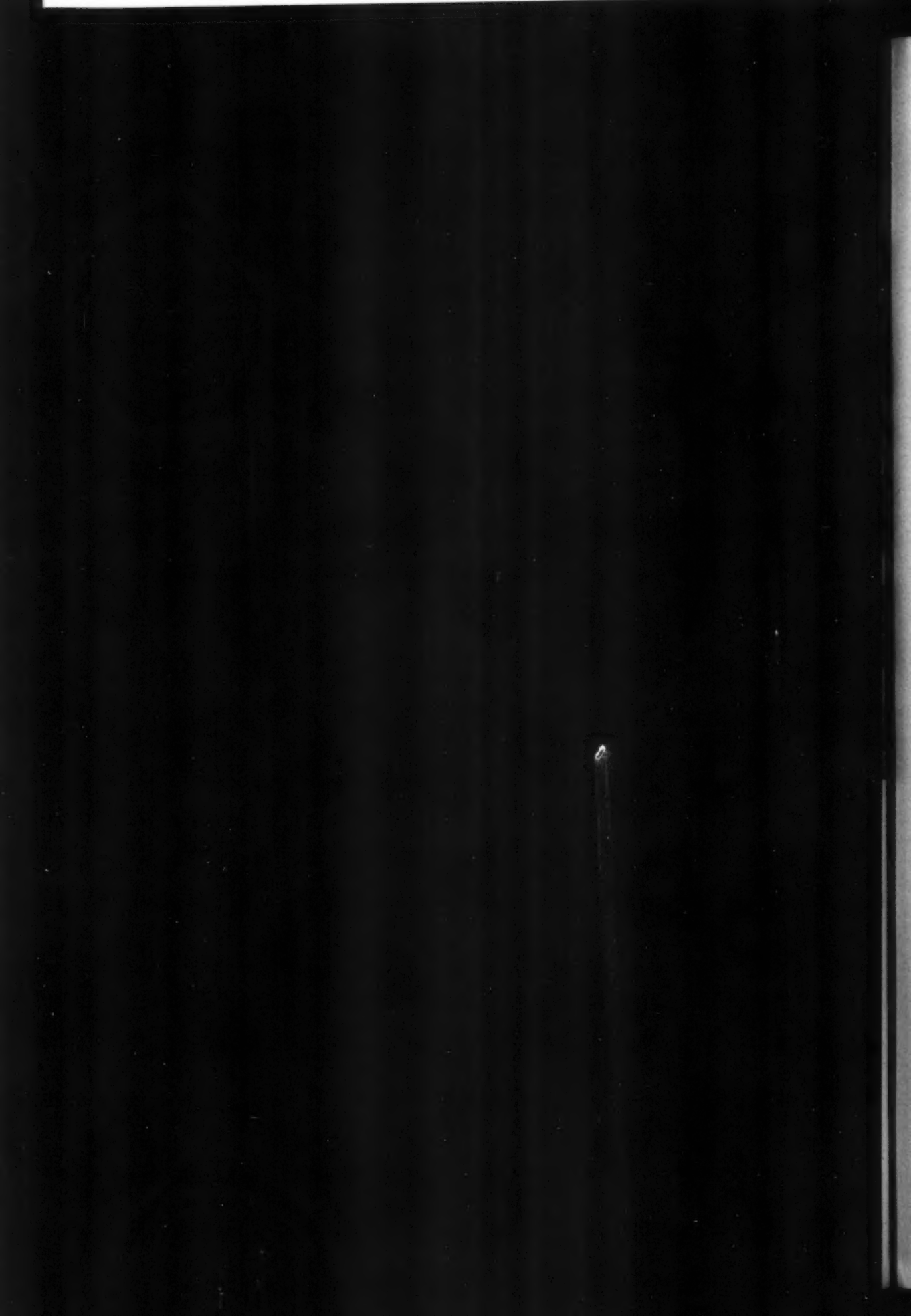


"OFF WITH THE OLD—ON WITH THE NEW"

THE NEW YEAR is off to a good start. And the Industry's first Resolution is not a new one but a resolve to do more this year to conserve vital materials so necessary to the operation of the War. The Nation has joined the Industry in its great objective.

Resolved, That no paper of any kind shall be treated as or recognized as wastepaper. Every piece of paper that has finished its work in one place shall be transferred to the Industry's national guard as *reserve paper,* to be processed and passed on to its next post.

The more we CONSERVE, the better we SERVE.



TRADE WINDS

U. S. Victory Wastepaper Campaign

▸▸▸ THE AMERICAN NEWSPAPER Publishers Association is sponsoring a new nation-wide campaign for the collection of wastepaper. The U. S. Victory Wastepaper Campaign, with Edwin S. Friendly, chairman of the Newspaper Committee, has undertaken the tremendous job of collecting 666,000 tons of wastepaper each month. Approximately half of the salvageable paper going into every city and town must be collected for re-use if this goal is attained.

The OPA has instituted double-barrelled action by amending the wastepaper regulation and price schedule; all of this another step in its program to eradicate black market operations in wastepaper. Amendment No. 6 to MPR 30, wastepaper sales regulation, became effective January 4; and Amendment No. 9 to RPS 32 went into effect January 3.

Starting ahead of the New Year, the Newspaper Committee sent to all daily papers promotional material and advertising copy with a special request for display advertising. It is believed the newspapers will respond generously, even with their heavily taxed advertising space, due to paper restrictions. Reports already received indicate that many newspapers are doing a remarkable job, and in many communities where campaigns have not been started, plans have been completed for elaborate programs after the first of the year.

Some interesting highlights are gleaned from the latest report of the Campaign:

Buffalo, N. Y.—An all-out collection on December 20, with weighing not yet completed, netted more than 2,000 tons, or about 5.7 lb. per capita.

Chicago—The officials of this City have pledged themselves to co-operate in the wastepaper salvage program as a vital contribution toward winning the War. Chicago businessmen believe the awakening of the public to the importance of saving paper not only will conserve much needed material but also will result in a marked improvement in the cleanliness of sidewalks, streets, and public buildings. All groups have organized to co-operate in the city-wide collection of wastepaper the morning of January 15.

Cincinnati, Ohio — Citizens were asked to put their Christmas wrapping and wastepaper in front of their homes Christmas night. On the next day—Sunday, December 26,—3,000 volunteers working on 300 trucks and at 332 collection depots collected 2,000,000 pounds of wastepaper. The remainder, 400,000 pounds, was picked up the next day.

Kalamazoo, Mich. — Not satisfied with its post-Christmas collection of 3½ tons of wastepaper, the local director of the Victory Wastepaper Campaign has advertised that more collections will be made on the 15th and

Hummel-Ross Victory Caravan

An outstanding feature of the wastepaper campaign in Richmond, Va., was this Caravan furnished by the Hummel-Ross Fibre Corp., Hopewell, Va. Mounted on truck at the left is an Italian Macchi C-200, single-seated fighter plane complete with machine guns, which was shot down in the North African campaign. The wings are attached so they can be folded back for traveling. The trailer at the right is equipped with souvenirs of African battles together with a complete display of "Paper Goes to War." Munitions, supplies and blood plasma are shown packed for overseas shipment. A battle scene gives a realistic effect.

Gair Company's "Scrap Hut" used in salvage drive at Tonawanda, N. Y. The jumbo rolls at the entrance were made of scrap paper and weighed 1,500 lb. each.

22nd of this month. Crews of Boy Scouts will assist and trucks will make pickups not only in the city but will cover the township.

Pittsfield, Mass.—A curb collection netted 91 tons. Then the schools took over and in the next five weeks netted an additional 61 tons and made $700 by the sale of this paper. The per capita collection throughout this period was 5.5 pounds.

Richmond, Va.—Curb collection by American Legion on December 19, weighing not complete, netted 500 tons, or 5 pounds per capita. (See Hummel-Ross Caravan.)

St. Joe, Mo.—Sub-committees have been formed to move dead business records out of stores and industrial plants. Old election ballots have been salvaged too, in this community.

Robert Gair Company, Inc.—Through its subsidiaries, Fort Niagara Corrugated Box Division, North Tonawanda, New York, and Tonawanda Boxboards Division, both Tonawanda, New York, this company (headquarters in New York City) has given renewed impetus to the Tonawanda Salvage Drive by the construction, in a prominent location in Tonawanda, of a "Scrap Hut." The four walls of this hut are constructed of bales of wastepaper of the usual commercial size, each bale weighing approximately 1,200 pounds—30 bales (a total of 36,000 pounds) of wastepaper being required to build the walls. Placed at the entrance were two jumbo rolls of corrugated paper, made largely from this scrap material, 14 in. wide and 72 in. high, each weighing 1,500 pounds. Inside the hut was displayed packages made from the board in which wastepaper is an essential raw material. This display has stimulated the collection of wastepaper and also has brought more full-time and part-time workers, both men and women, to the Gair mills.

Hummel-Ross Fibre Corporation—A large contribution to the success of the wastepaper drive in Richmond, Virginia (sponsored by the American Legion) was the dramatic support of the Hummel-Ross Caravan, furnished by the Hummel-Ross Company. The caravan was stationed at the most prominent intersection of the business district. Loud speakers informed the public of the need for conserving paper and collection details were repeated. Uniformed attendants accompany the caravan which is being used throughout the nation-wide drive. It is now on a tour to cover wastepaper collection centers. When the caravan has completed its tour of Virginia schools, it will travel through twenty-seven cities in North Carolina.

Boys and Girls—In Van Wert, Ohio, the four public schools have been given flags bearing "S" for salvage. These flags can be flown only if each student brings a minimum of ten pounds of wastepaper to the school each week. The school making the best record will be awarded a big American flag by a local industrialist.

The school children of Canton, Ohio, have enlisted in a youthful army to become *Soldiers for Uncle Sam* in the Wastepaper Campaign in that city. School children of Omaha, Nebraska (34,000 of them) in one day turned in 78,240 pounds of paper—more than two pounds per student.

The *Boy Scouts of America* have gone into action in the U. S. Victory Wastepaper Campaign. Reports from New York headquarters state that many Scout Executives are at work directing wastepaper salvage activities among their troops.

Fourteen-year-old Charlotte Harris of St. Petersburg, Florida, has been crowned *Salvage Queen* of the country. She has collected 8,341 pounds of wastepaper with a wheel barrow which she has christened "Victory Vehicle."

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LARGE PAPER COMPANY PLANNED FOR BRAZIL*

Brazil's book, newspaper and magazine publishers, harassed by reduced imports of paper and newsprint from abroad, may soon find the solution to their problems in their own national backyard. A huge paper and cellulose company, called the largest single private enterprise to be launched in this country, is being formed to tap the limitless source of paper pulp offered by Brazil's vast forests. The new company will be known as the *Companhia Nacional de Papel e Celulose.*

Recent announcements indicate that the company will have a total capitalization of 300 million *cruzeiros,* approximately $15,000,000 in United States money. One-third of this sum has been underwritten by existing paper and cellulose mills in the states of Santa Catarina, Parano and Sao Paulo; another $500,000 will be underwritten by the 400 organizers of the enterprise and the balance will be subscribed by 140 leading radio stations, newspapers and magazines and the public in general.

Brazilian publishers have been as hard hit by current paper shortages and quotas as their colleagues in the United States. Rural and provincial journals, in particular, have felt the pinch of wartime paper rationing. In the case of the book industry, production in the Sao Paulo area alone dropped about 18 per cent from a peak of 2,484,238 books in 1936, with an even greater production drop registered since Brazil entered the war as an ally of the United States.

The country's infant paper industry, whose 38 mills produced about 260,000 tons of paper in 1941, has been unable to supply more than a small fraction of the paper needed by this country's publishers. In Rio de Janeiro alone, 19 newspapers with a combined circulation of almost 1,000,000 account for approximately 25 per cent of domestic newsprint production. And Brazil has nearly 2,000 newspapers and magazines in all, plus a thriving book industry which produces about 8,000,000 copies a year.

To offset shortages and meet the country's present and future paper

(*) This news submitted by the Press Division of the Office of the Co-ordinator of Inter-American Affairs, Washington, D. C.

PAPER · · · America's 6th Industry

PAPER LEARNS TO FLY...

(NEWS ITEM: *The Armed Forces are using paper parachutes for dropping packages weighing up to 175 pounds.*)

Paper parachutes are now being used to drop cargo by the Armed Forces; radio and weather instruments; and flares to reveal enemy installations. Made of special paper stock, these parachutes withstand rain, cold, wind and safely lower up to 175 pounds of emergency supplies.

This is another war use found for paper. When the Victory is won, paper parachutes will be available for civilian use . . . helping, among other things, to deliver supplies and life-saving essentials to remote areas.

The responsibilities of the Pulp and Paper Industry have increased with the added war uses for paper. The many practical and technical advancements we are learning will result in greater improvements and more efficient equipment in our post war Paper Making Machinery.

The improved "Rapidrape" method for installing Fourdrinier Wires, exclusive with Puseyjones, has resulted in faster, safer wire changing. Production formerly lost through long shut-downs is reduced to a minimum.

Puseyjones men and production facilities are on war work. However, since the WPB has declared the Paper Industry essential, we are in a better position to supply vital repair and replacement parts to keep present equipment operating efficiently.

Puseyjones engineers will welcome the opportunity to aid you with your post war problems. We have prepared three informative articles which are yours for the asking—"The Post-War Fourdrinier," "Development of Stream-Flow Vat System," "The Flow Spreader." Ask for reprints by name.

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery

Wilmington, Delaware, U. S. A.

needs, Brazil has a huge potential reservoir of paper pulp in its many hundreds of thousands of square miles of virgin forest. Lack of capital and poor transportation have been handicaps to working these forests in the past, but the new *Companhia Nacional* has the capital and plants to provide adequate transport facilities for tapping remote forest areas. Eventually, its founders hope, Brazil's domestic industry will make the country self-sufficient where paper is concerned.

Meanwhile, reduced paper quotas have not prevented Brazilian book publishers from giving another demonstration of this country's steadily growing solidarity with the United States, this time in the cultural field. A good proportion of their precious paper ration is assigned to Portuguese editions of North American best-sellers.

One local publisher alone, the *Editora Nacional*, of Sao Paulo, printed 23 translations of outstanding works by North American writers since January 1, with more planned for 1944. Titles include fiction, scientific works, law books, essays, histories, biographies and studies of the world at war. Among them were:

One World, by Wendell L. Willkie; *The Moon Is Down*, by John Steinbeck; *How to Win Friends and Influence People*, by Dale Carnegie; *Life and Letters of Thomas Jefferson*, by Francis W. Hirst; *Inconstant Star*, by Adelaide Humphries; *The Nature of Judicial Process and the Growth of the Law*, by former Supreme Court Justice Benjamin N. Cardozo; *And Now Tomorrow*, by Rachel Field; *Italy from Within*, by Richard G. Massock, and *What About Germany?* by Luis P. Lochner. *One World* went into two editions in as many months.

The Sao Paulo area now handles about 70 per cent of Brazil's book production, with 15,000 trained and specialized workers employed in 368 typographical establishments, 33 lithograph shops and 26 stereotype plants. *Editora Nacional* alone publishes some 500,000 books a year, and the excellent workmanship and low cost of publishing in this area has led many publishers in other parts of the republic to send their manuscripts to Sao Paulo for printing and binding.

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▶▶▶ NEW EQUIPMENT is being installed at the Port Rouge, Quebec, plant of Building Products, Ltd., Montreal, Canada. It is estimated that the cost of the equipment and extending the plant will approximate $89,000.

MORE WORKERS IN WOODS IN CANADA

Two thousand more workers were in the woods of eastern Canada on December 11, 1943, than were there at the same time in 1942, according to a recent statement issued by Labor Minister Humphrey Mitchell.

Men from prairie farms were enrolled for this type of work at the rate of 100 per day and their draft status was being continued while thus engaged. Prisoners of war, and Japanese and Italian internees were also put to work to help to meet the industry's manpower requirements, and the Federal Department of Labor was making a special effort to insure that there would be no falling off in the number of men engaged in the industry during the following two weeks.

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FINANCIAL

▶▶▶ SECURITIES prices at the end of the year showed, in general, the effect on world markets of the changing situation in the war. In a year the Allies have gone from defense to the offense, with many victories recorded, and the optimistic tone was reflected in better prices for stocks and bonds. The threat of a rail strike, however, resulted in few major changes during December as compared with the end of November.

A. P. W. Paper Company—Net profit from July 1 to October 23 was $11,535 as against a net profit of $2,188 for the comparable period in 1942.

Crown Zellerbach Corporation—Net profit for the half of the fiscal year ending October 31 was $3,767,883 as compared with $3,594,048 for the same period of the preceding fiscal year.

Masonite Corporation—Net profit for the quarter ending November 30 was $282,555 as against $346,584 for the comparable period in 1942.

National Container Corporation—Net profit for nine months ending November 30 was $584,986 as against $583,357 for the same period in 1942.

Rayonier, Inc.—Net profit for the six months ending October 31 was $891,803 as against $1,078,298 for the comparable period in 1942.

United Paper Board Company—Net profit for the quarter ending August 28 was $25,633 as compared with $14,322 for the comparable period in 1942.

West Virginia Pulp and Paper Company—Net income for the fiscal year ending October 31 was $2,610,496 as compared with $2,789,248 in the preceding fiscal year. As against this company profit, the company paid approximately $4,900,000 in federal taxes. A stockholders' meeting has been called for January 7 to approve the proposed issue of $20,000,000 of new preferred stock carrying a dividend rate of 4½ per cent. The new stock will be used to retire approximately $15,000,000 in the present 6 per cent preferred stock to retire the outstanding funded debt of $4,600,000 carrying 3 per cent interest and it is also proposed to authorize the issue of 500,000 additional shares of common stock.

New York Stock Exchange—Stocks

	Closing Prices Dec. 31, 1943	Dec. 31, 1942	Nov. 25, 1943
A. P. W. Paper Co.	2½	1⅜	2⅛
Celotex	11¼	8⅜	12¼
Same Preferred	17¼	15*18¼–18½	
Certain-teed	4¾	2¾	*5¾–6
Same Preferred	59¾	31½	67
Champion P. & F. Co.	23¼	18½	*20–20½
Same Preferred	108	100	107¼
Container Corp.	20½	16¼	21½
Cont. Diamond	11½	6¾	*12–12½
Crown Zellerbach	16¼	11⅛	16½
Same Preferred	98½	82½	98
Dixie Vortex	15½	9¾	14
Same "A"	44¼	39	44¼
Robert Gair	2⅞	1⅜	3
Same Preferred	*13¼–13½	9	13½
Gaylord Container	13½	9¼	12¾
Same Preferred	51	53	51⅜
International Paper	14⅛	8⅛	13⅛
Same Preferred	69¼	43⅜	66⅜
Kimberly-Clark	32½	25½	25¼
MacAndrews & Forbes	26¼	30	25¼
Masonite	38	33¾	38
Mead Corp.	8	6	8
Same Preferred	*79¾–82	67½	84
Paraffine Cos.	43¼	36⅜	43½
Same Preferred	*104–105⅞	100	102
Rayonier, Inc.	13½	12	13⅝
Same Preferred	29	26½	31
Scott Paper	39½	38	39
Same 4½% Pf.	*111–112	113½	111
Same 4% Pfd.	*108–110	108	110
Union Bag & Paper	9⅜	7⅞	10
U. S. Gypsum	73	61	74½
Same Preferred	170	173	179

New York Stock Exchange—Bonds

Celotex 4½%		99	101¼
Certain-teed 5½%	101¼	93	101
Champion P. & F. Co. 4½%		104	
Inter. Paper 5%		102¾	104
Same 6%	106½	105½	

New York Curb Exchange—Stocks

Am. Boxboard	6	4⅜	
Great Northern	30	25¾	
Hummel Ross	4	3¼	
St. Regis	4⅜	1½	3⅛
Taggart	5	3¾	4¼
United Wall Paper	2½	1⅞	2⅜

*Closing Bid and Asked Prices

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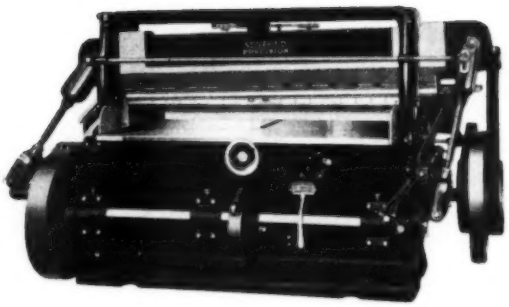
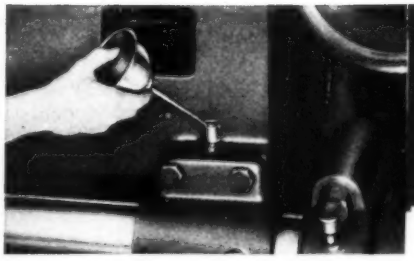
▶▶▶ ALERTNESS on the part of Joseph Van Stippen of Appleton, Wisconsin, saved a twenty-five dollar War Bond for a woman in Chicago. When Mr. Van Stippen, a worker at the Sangamon Paper Mills of Kaukauna, was unloading a carload of waste paper at the mill, he noticed an attractive looking envelope, opened it, and discovered the bond.



TIMELY TIPS for keeping your Seybold in good trim!

On account of war time restrictions there are no *new* Seybold Trimmers available. But with the simple, easy procedure outlined below, you can keep your Seybold machines in good trim for years and years. Should you need repairs our nearest office will serve you promptly.

FOLLOW THESE THREE EASY RULES FOR LONG-LASTING SERVICE

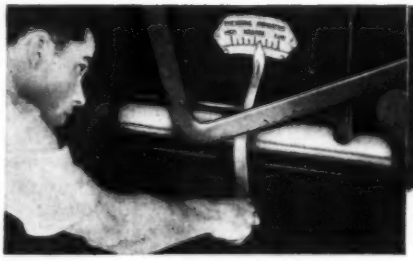


do this once a DAY

Lubricate drive shaft bearings, clutch, and moving parts. Inspect cutting knife.

do this once a WEEK

Check the clutch and brake adjustment.



do this once a MONTH

Inspect the clamp pressure mechanism.

SEYBOLD

• DIVISION •

HARRIS-SEYBOLD-POTTER COMPANY

823 WASHINGTON ST., DAYTON 7, OHIO

WISCONSIN FOREST INDUSTRIES INFO. COMMITTEE MEETS

▶▶▶ Forestry provided the theme for preferred consideration at a meeting of the Wisconsin Forest Industries Information Committee held at Wausau, Wisconsin, December 21, 1943. Committee Chairman Folke Becker, president, Rhinelander Paper Company, propounded the question as to whether or not this organization should assume a position of leadership in furthering industrial forestry or in sponsoring such reasonable cutting regulations as are necessary to bring about an acceptable forest situation. Calling attention to the fact that public interest was being focused intently upon the conduct of forest practices, now emphasized by the exact cutting necessary to meet the urgent demands of the armed forces, he declared this subject to be one which should merit the serious consideration of the forest industries as well as timber owners. Insistence upon delivery of paper, fibrous products, cellulose, chemicals, truck, aircraft and boat parts coming from Wisconsin forests has prevented the exercising of the best controls. With this point in view Mr. Becker had invited a representative of the Wisconsin Conservation Department to frankly discuss practical forestry with respect to Wisconsin conditions.

Fred G. Wilson, superintendent of Co-operative Forestry, Wisconsin Conservation Department, talked comprehensively on the accomplishments of forest regrowth in Wisconsin as carried out by the State of Wisconsin and by corporations and individuals, citing standards and conditions which have proven necessary to produce trees commercially. He displayed illustrations of a forest which he himself had planted and on which the first cuttings of pulpwood have recently been made. He related the various attempts at legislation, including a bill which expired in the last legislature, comparing its provisions with the pending Michigan bill and the Maryland law. He called attention to the fact that Wisconsin, last year, ranked second of all states in the planting of trees and that there existed a real interest in timber regrowth which was not confined to public agencies, but extended to the wood consuming industries, some of whom had special local problems not fully appreciated by outsiders.

Participants in the discussion which followed were: O. T. Swan, secretary, Northern Hemlock and Hardwood Manufacturers Association, and L. A. Furlong, M and O Paper Company, chairman of the Minnesota committee.

Harold S. Crosby, secretary to the committee, reported on the activities of the past six months, stating that as a result of the committee's and industry members' efforts in persuading their congressmen to visit plants and forests and to discuss operating problems with company executives, the Wisconsin delegation had gained a much better perspective of the importance of pulp and paper, lumber, veneer and other forest industries manufactured in their home districts.

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▶▶▶ THE NATICK BOX AND BOARD COMPANY, Natick, Massachusetts, recently was acquired by Robert Gair Company, Inc., New York, and will henceforth be known as Natick Box and Board Division, Robert Gair Company, Inc.

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PULPWOOD CAMPAIGN MUST BE STEPPED UP TO SPEED VICTORY

A late report just received from the War Activities Committee of the Pulpwood Consuming Industries states that during the fall months of October and November, when the 1943 Newspaper Victory Pulpwood Campaign was at its peak, mill receipts of pulpwood in the Lake States showed some improvement. However, the Committee states that military and civilian requirements for pulpwood products in 1944 will necessitate an even greater effort by farmers, pulpwood cutters, and part-time workers than in 1943, on account of the tightening manpower and transportation shortages.

Mill receipts of domestic pulpwood throughout the Nation totaled 11,911,000 cords during eleven months of 1943. This is only 1,089,000 cords under the 13,000,000 cord goal set for the year by the WPB, with December figures at yet unreported. Total mill receipts in October were 1,228,000 cords and in November 1,115,000 cords.

A very timely article "If You Can't Shoulder a Rifle, Get an Axe!" by Webb Waldron, a member of the staff of *The Reader's Digest*, appeared on the back cover of the January issue of that magazine. This article was widely reprinted through the courtesy of the *Digest*, and copies were sent gratis to service men all over the world through the U. S. Army Service Forces.

Quoting from a release sent to all newspapers by the War Activities Committee:

"If you can swing an axe, you can speed Victory this year. Every cord of pulpwood you cut means more smokeless powder, more blood plasma containers, more shell casings. Every cord cut now brings Victory nearer."

ST. REGIS CO. BUYS VAST TIMBER ACREAGE

Purchase of all logging operations of the West Fork Timber Company, Lewis County, Washington, and the acquisition of perpetual cutting rights to the 109,000 acres of timber land owned or controlled by West Fork, was recently announced by Roy K. Ferguson, president of the St. Regis Paper Company of New York. L. T. Murray, president of the West Fork Timber Company, and an outstanding figure in the logging industry, will become associated with the St. Regis Company.

Strategically located 45 miles from the company's Tacoma pulp mill, this purchase, which constitutes what is believed to be one of the major transactions in the timber industry in more than 25 years, will enable the St. Regis Company to again operate its Tacoma pulp mill. [Closing of this mill was the indirect result of the WPB General Preference Order M-251 issued in October, 1942, restricting the operation of pulp mills in the Puget Sound Area.—cf TPI & PW Nov. '42.] The mill will be under the direction of Walter DeLong, vice president of the St. Regis Paper Company.

In addition to assuring the company ample supplies of pulpwood in perpetuity, this West Fork timber also will make available an additional 100,000 tons of pulp annually.

There is an ever-increasing demand for protective packages, both for use in the War and for home consumption. The recent construction of a new bag plant in Kansas City by the St. Regis Paper Company, together with this timely purchase of timber rights, will play a major part in making multi-wall bags available to do a vital war time job, and in gearing production facilities to adequately handle the postwar requirements of the papermaking industry.

The newly purchased tract is one of the largest expanses of fir and hemlock in the district and will greatly add to the company's holdings, which presently amount to more than five billion standing feet of timber in the Pacific northwest.

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▶▶▶ RECONSTRUCTION of the Tee Lake, Ontario, steam plant of J. R. Booth, Ltd., Ottawa, Ontario, which was recently destroyed by fire, is now under way. The new mill, which will be similar in design to the previous building, will have a capacity of 125,000 fbm per ten-hour shift. It is anticipated that operations will again be resumed early next season.

MAKE THE MOST OF THIS DEPENDABLE SOURCE OF GOOD, LOW COST PAPERMAKING FIBRES

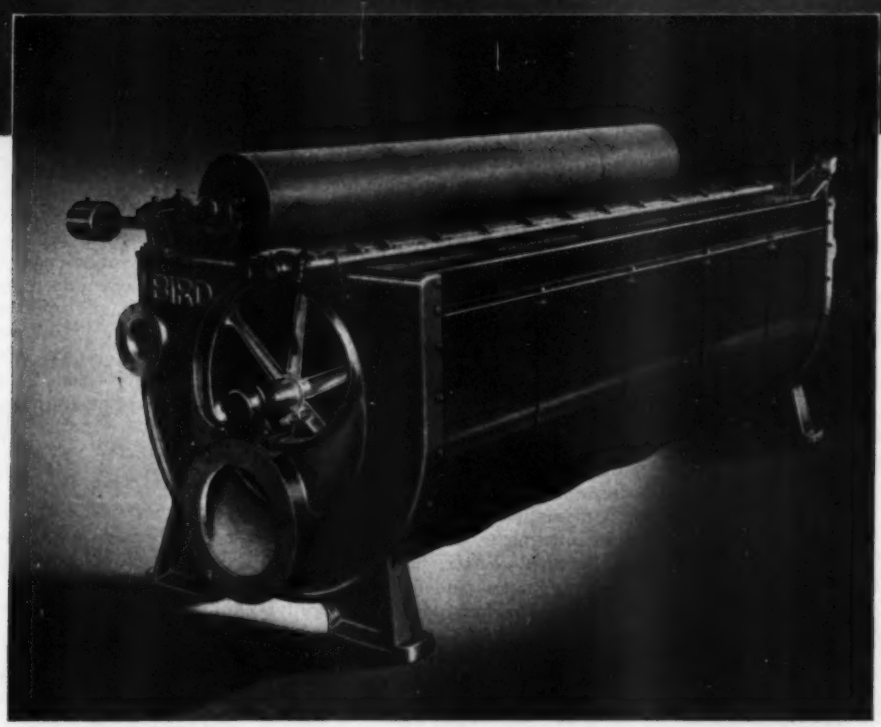


Figure the amount of stock recovered by the Bird Save-All and delivered to the machine chest for immediate manufacture into needed paper and we won't have to remind you of its importance in view of present stock conditions.

Don't fail to get in touch with us if there's anything we can do to help you make sure that your Save-All system is doing the best possible job—a job that's of prime importance, today.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Washington News

OVER-ALL PAPER PRODUCTION IS REDUCED BY WPB

Preliminary recommendations of the Director of the Forest Products Bureau have resulted in the Requirements Committee of WPB making its determination relative to the volume of paper and paperboard to be produced in the first quarter of 1944.

Over-all U. S. paper and paperboard production during the first quarter of 1944 is estimated at approximately 1,400,000 tons per month, or about 2.3 per cent below the average monthly production in the third quarter of 1943. Proposed minimum production is, however, about 9 per cent less than that estimated per month in the first quarter by the mills. The program determination was issued by the program vice-chairman, J. A. Krug, who is also chairman of the Requirements Committee.

To effectuate this program determination, the Requirements Committee, speaking through Program vice-chairman Krug, directed that pulp be allocated under WPB Order M-93 not to exceed the amounts specified, earmarked for use in the manufacture of particular types of paper and nonpaper products, and that the appropriate limitation orders governing consumption of these products be issued or continued. The program determination expressly approved the proposed limitations on consumption of paper that have been announced for incorporation in Orders L-240, L-241, L-244 and L-245, concerning newspapers, commercial printing, magazines, and books, respectively.

During the first quarter of 1944, the WPB program determination calls for the production of a minimum of 1,398,837 short tons of the various types of paper and paperboard to be produced each month from 837,060 short tons of pulp as listed in the accompanying table.

The Forest Products Bureau is authorized to transfer not more than 50,000 tons of pulp during the first quarter from the amount assigned to make container board, to mills making coarse paper products, including wrapping and bag paper, if it appears an adjustment is warranted.

A maximum reserve supply of pulp approximating 69,000 tons per month for the first quarter, has been established for export and non-paper uses, in addition to the amounts specifically allocated in the table set out above.

VIEW EFFECT OF NEW PULP ALLOCATION PLAN

The big late news in Washington was the announcement of the extent to which the new pulp allocation plan, effective January 1, for the first quarter of the year, will restrict paper production. In broad terms the allocation of pulp has been made for basic paper grades, and orders are scheduled to implement the allocation order by restriction on the production of various grades of paper. Newsprint is to be reduced to a consumption of only 76 per cent of 1941 usage. Magazine publishers will be able to get only 75 to 90 per cent of the base period, book publishers will have to cut up to 25 per cent from the 1942 bases, and commercial printers will be able to use only 75 per cent of the quantity consumed in 1941. The figures given are for the large users, smaller consumers being allowed to operate on a base more nearly that of the base period.

While the producers estimated that there would be 876,000 tons per month available during the first quarter, the actual allocation provides for the use of only 837,000 tons. The heaviest reduction from the production proposed by the mills is in the group including groundwood, book and fine papers, where the estimates of the mills were cut 21 per cent. A cut of 14.7 per cent in estimates of newsprint producers was heavier than the cuts in any other grades. It was shown that the pulpwood supply for the first ten months of 1943 was 16 per cent below that for the same period in 1942.

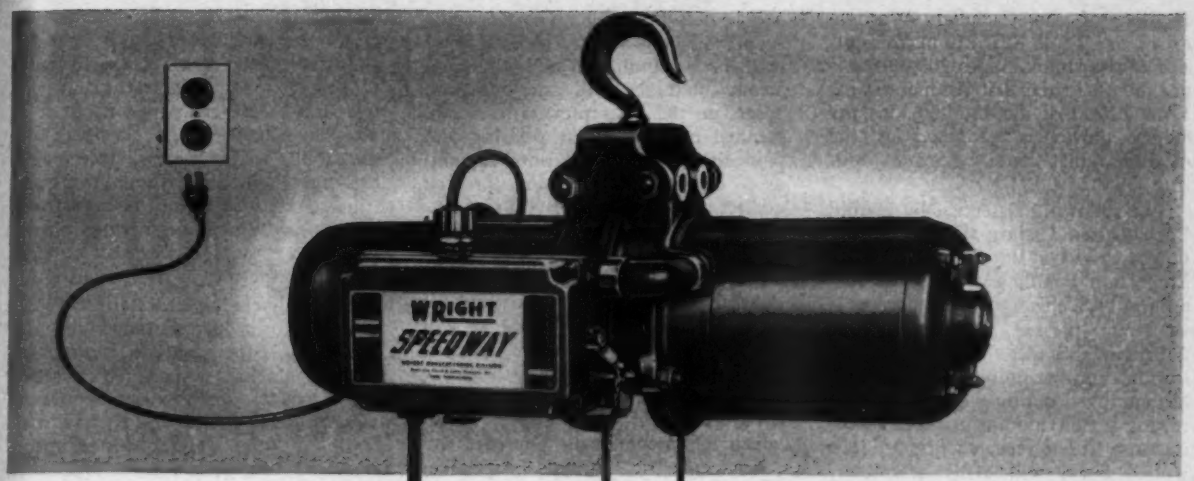
Types of Paper	*Minimum Anticipated To be produced in Tons*	*Wood Pulp Allocated in Tons*	*Ratio of Pulp to Products*
Paper			
Coarse	157,190	155,618	99.0
Book	114,732	78,707	68.6
Building Papers	77,137	12,573	16.3
Fine	74,178	62,755	84.6
Special Industrial	21,770	13,998	64.3
Newsprint	60,000	60,780	101.3
Groundwood	44,784	45,232	101.0
Multi-Wall	29,000	30,247	104.3
Sanitary	66,434	65,437	98.5
Tissue	13,428	13,334	99.3
Absorbent	7,616	4,973	65.3
Paperboard			
Container Board	363,447	199,096	54.8
Folding Boxboard	167,801	40,104	23.9
Building	76,585	36,788	48.0
Set-up Boxboard	63,016	592	.9
Cardboard	4,438	1,741	39.2
Other Paperboard	57,281	15,085	26.3

▶▶▶ AN ORDER PERMITTING a higher ceiling for lightweight newsprint for a four-month experimental period has been issued by the Office of Price Administration. The order provides that additional production costs may be added to the present ceiling price for standard newsprint paper from December 1 to March 31. On the basis of cost studies for that period, the OPA will be expected to fix a ceiling price exactly reflecting the difference in the cost of producing 30-pound newsprint and the present 32-pound. Some of the domestic mills have notified customers that during the first quarter of 1944 they will be permitted to specify any portion or all of their contract tonnage in 30-pound weight at $5 per ton over the ceiling price for 32-pound paper.

GOVERNMENT TO PURCHASE EXCESS CANADIAN NEWSPRINT

Newsprint that may be available for shipment from Canada to the U. S. in excess of 182,000 tons per month during the first quarter of 1944 will be purchased by U. S. Government authorities for use as a stockpile to insure supplies of newsprint for the second half of 1944, according to an announcement made December 21, 1943, by Donald M. Nelson, chairman of the War Production Board.

This additional measure of protection to the newsprint supply has been made possible, Mr. Nelson said, by the



A

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increased production

ACCO

In Business for Your Safety

● The period of hurry—the need for faster production—won't be over with the war. Post-war work will impose its demands too. Get an Improved WRIGHT *SPEEDWAY* Electric Hoist as soon as possible for both now and tomorrow. Because it speeds up work and makes jobs easier, WRIGHT'S *SPEEDWAY* saves labor time, cuts handling costs—quickly pays for itself.

Women workers in war plants especially appreciate the push-button ease with which the WRIGHT *SPEEDWAY* is operated. The *SPEEDWAY* helps them maintain their morning vigor throughout the afternoon.

The *SPEEDWAY* Electric is a sturdy, light weight, cable hoist, designed for fast lifting on assembly floors and for general use. Designed with spur gear construction, magnetic control, and mechanical features found only in the more expensive production-type hoists. Yet it is priced economically low.

Talk to your WRIGHT distributor about *SPEEDWAY*'s advantages. He is listed in your classified telephone directory.

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York, Pa., Chicago, Denver, Los Angeles,
New York, Portland, San Francisco

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT

FLYING OVER THE WRIGHT HOIST PLANT

WRIGHT *SPEEDWAY* HOISTS

decision of the Canadian Wartime Prices and Trade Board to make available to the United States 200,000 tons per month in the first six months for 1944 instead of the 182,000 tons per month previously proposed as the maximum that could be made available.

The following statement by Harold Boeschenstein, acting director of the Forest Products Bureau of the War Production Board, was issued in connection with this announcement:

"I am pleased to receive from Canadian authorities the encouraging information that pulpwood production has improved during the current wood cutting season and am gratified at this response to our repeated urging. The United States will glady accept any newsprint in excess of the 182,000 tons maximum estimated by Canadian officials in November when they were pessimistic concerning their ability to continue to supply newsprint at even that level. At the same time, minimum shipments of pulpwood and pulp, so necessary to our essential military program and our other civilian paper requirements, must be maintained.

"We prefer that Canadian authorities allow us the benefits of this increased wood production proportionately in pulpwood, pulp and newsprint. This would give us more flexibility in meeting shortages which are very serious in other paper products and certain highly important military non-paper uses. This the Canadian authorities agreed to do in November, and with that understanding, the War Production Board is imposing the necessary restrictions on all branches of the graphic arts industries on an equitable basis.

"The Canadian commitment to furnish newsprint to the U. S. at the level of 200,000 tons a month is limited specifically to the first six months of 1944. The best assurances we have been able to obtain from Canada concerning the 1944 shipments of pulpwood and pulp, so important to other production programs, reflect serious decreases from 1943 levels—decreases that are substantially greater than their revised estimates for newsprint. We are still hopeful that the situation with respect to these items, too, will improve. We shall continue to encourage in every proper way increased Canadian production of pulpwood and its equitable use for other essential products as well as for newsprint.

"We propose to conserve the tonnage gained through the improved outlook in newsprint supply, so that in the second half of 1944 our newspapers and other essential users of paper may have a reserve to fall back on should production in the second half be less favorable. Therefore, the War Production Board, in accordance with the determination of its Requirements Committee, will issue limitation orders on the basis previously recommended by the various printing and publishing industry advisory committees. By stockpiling during the first quarter of the year any excess in newsprint over 182,000 tons per month which the Canadian newsprint industry may supply to use, we hope to stabilize the newsprint situation for once and for all. By so doing we will in large measure remove the disheartening uncertainty caused by steadily declining inventories and consistent deterioration in wood supply under which our graphic arts industries and other industrial groups dependent upon Canadian imports have operated in the last year.

"If Canadian deliveries of newsprint, as now anticipated, are forthcoming without depleting wood inventories further, the application of these measures of limitation will place the newsprint-using industries in a sounder position to meet the unpredictable needs of the second half of 1944 than it has known at any time in many months."

FLASH!

An announcement from Washington dated January 10 states that the Government will store most of the stockpile of newsprint which will be accumulated over the next six months and re-convert it into pulp to manufacture containers and wrapping papers to pack overseas shipments.

PROPOSE LOWER DUTY ON NEWSPRINT AND WATERLEAF PAPERS

Two bills have been introduced in Congress providing for the reduction of duties on newsprint and waterleaf papers, and hearings are scheduled before the Ways and Means Committee early in the new year. The more important proposal is that of the bill introduced by Congressman Boren which would change the present provision for standard newsprint, under which standard newsprint is duty free in weights between 30 and 35 pounds, with the usual basis 32 pounds. Mr. Boren's proposal would fix the weight range as between 25 and 35 pounds, would permit the use of some bleached sulphite while the present law permits only unbleached pulp, and proposes some other minor changes. The weight range of 25 to 35 pounds was that used informally in hearings before the Boren committee by representatives of the publishers. The official statement of the American Newspaper Publishers Association, however, asked only for 30 pound paper, with sufficient tolerance to prevent paper, made at a 30 pound basis, to be classified for duty if the weight were slightly under that figure. In other words, the publishers ask for sufficient tolerance from the present 30-pound minimum to permit them to secure increased yardage by cutting the weight two pounds.

The bill relating to waterleaf paper provides for a duty of 10 per cent on "waterleaf paper suitable for use in the manufacture of vegetable parchment." While the obvious intent is to secure a favorable rate on the raw material for the vegetable parchment manufacturers, there is some difference of opinion as to whether the phrasing of the bill would not permit importers to bring in waterleaf paper for other products, such as those produced by the use of other saturating media, in the production of artificial leather, etc.

▶▶▶ THE TRANSPORTATION SITUATION affecting the pulp and paper industry is viewed as critical by F. E. Hufford, transportation consultant of the WPB Forest Products Bureau. Mr. Hufford is the Government presiding officer of the Pulp and Paper Transportation Industry Advisory Committee. The paper industry, it is pointed out, has done a good job in conserving transportation so far by heavier carloading and faster turnaround of cars; however, it is believed still more can be accomplished. It was the opinion of the committee that cross hauling and excessive hauling by the pulp and paper manufacturers must be reduced.

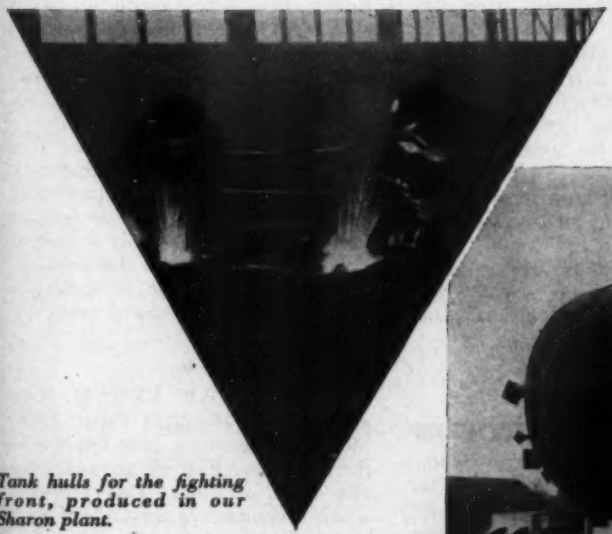
▶▶▶ A SPECIAL OFFICIAL MISSION to England for the Forest Products Bureau of the WPB will keep Arthur G. Wakeman, assistant director of the Bureau, abroad for about six weeks. Mr. Wakeman left Washington the latter part of December. His assignment includes conferring with British and other government and industrial officials on problems involving pulp, paper, and paperboard products. Special attention will be given to international problems, and the co-ordination of the activities of the allied countries.

▶▶▶ THE RESIGNATION OF Harry M. Bitner as director of the Printing and Publishing Division of WPB was announced on December 31, effective as of that date, by Harold Boeschenstein, director of the Forest Products Bureau. Appointed to suc-

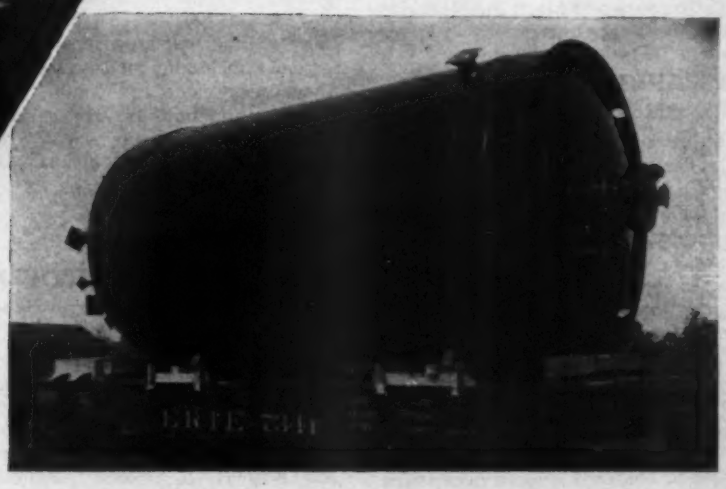
BUILDING TOMORROW'S "KNOW-HOW"

Here in the General American Plate & Welding division plant at Sharon, Pennsylvania, men weld the armored hull of General Sherman tank. It's one of the best tanks in the world; everything that goes into it must be thoroughly *right*—so its makers place their confidence in GATX, as do industrial leaders in hundreds of widely different lines.

The most important thing we're producing now at Sharon and other GATX plants is *know-how*—vastly augmented experience, gained from geared-up wartime production, that will enable us to better serve YOUR peacetime needs.



Tank hulls for the fighting front, produced in our Sharon plant.



Pressure vessels for the industrial front, produced at our Sharon plant.

Building for today's fighters—Planning for tomorrow's builders

GENERAL AMERICAN TRANSPORTATION CORPORATION

GATX GENERAL AMERICAN PLATE & WELDING DIVISION PLANT AT SHARON, PA

Plate & Welding Division — Sharon, Pennsylvania

"Specialists in plate fabrication—manufacturers of pressure vessels of steel, alloys and aluminum—all classes of welding—process equipment of all types—chemical engineering laboratories and service—completely equipped field erection department."

ceed Mr. Bitner is Arthur R. Treanor, who has been deputy director of the Division for two months. Mr. Treanor is vice president, editorial counsel, and chairman of the labor committee of the Booth Newspapers, Inc., of Michigan.

▶▶▶ DUE TO THE SHORTAGE of pulpwood, one paper machine in the Fort Frances (Ontario) plant of the Ontario-Minnesota Pulp and Paper Co., Ltd., has been shut down. This machine has an annual capacity of 21,000 tons of newsprint. A larger machine with an annual capacity of 36,000 tons has been kept in operation.

▶▶▶ THE NEW CHIEF OF the Magazine & Periodical Section of the Printing and Publishing Division of WPB is Allen E. Norman, who succeeds Walter J. Risley, Jr. The resignation of Mr. Risley became effective December 31, and Mr. Norman's appointment was announced on that date by Arthur R. Treanor, who on that date became new director of the Printing and Publishing Division. Mr. Norman has served as a consultant in the Section for the past five months. He is secretary of Fawcett Publications, Inc., New York City.

◆

RESEARCH AT INSTITUTE ON MILKWEED FLOSS

Milkweed is soon to be recognized as a valuable crop according to Dr. Boris Berkman of Appleton, Wisconsin, who heads the research being carried on concerning this plant, which for years has been considered an obnoxious weed. The reason for the dignity acquired by this wayside pest can be attributed directly to the war. Berkman's research is being carried on at the Institute of Paper Chemistry which is affiliated with Lawrence College. The immediate objective is the development of the milkweed floss which he contends is much better than the kapok which is used in the stuffing of life preservers, the source of which was cut off by the war. Not only did the war choke off the source of kapok but the rapidly expanding navy and use of the seas has created an unusually great demand for life preservers. According to Dr. Berkman, the milkweed fluff can be made into a moisture repellent, springy product which is six times as buoyant as cork and six times lighter than wool. It is also warmer and a life jacket which contains just three pounds of this milkweed filler will keep a man afloat for 100 hours. The present experimental factory for producing this floss is located in Petosky, Michigan, and has been in operation about six weeks. An enlargement to this plant, being built at the request of the Government, is expected to start operations soon. Its capacity is expected to be 1,000,000 pounds of floss annually. Michigan also has been the location of the test program of collecting the milkweed pods. During the past year a quarter of a million bags were collected in Michigan and paid for at the rate of 15c for a bag of green pods and 20c for dry pods. It is the hope that schools and similar organizations will co-operate in the future in collecting these pods inasmuch as the Government needs 10,000,000 pounds of the floss this coming year and it is believed only by such co-operative harvesting will this supply be fulfilled. Dr. Berkman, who for 20 years was a surgeon on the staff of a Chicago hospital, has invented a machine that separates the fluff from the seeds in the milkweed pods and his experiments have also resulted in a use for other portions of the milkweed plant. One type of fiber from the stalk is useful in making gun cotton. Other fibers are possibilities in making cloth and paper, and the oil from the seeds resembles soy bean oil. Milkweed plants prefer sandy soil but will grow in practically any land including most waste land. About one to one and one-half tons of leaves and pods may be expected from an acre and the scientist has great hopes in the use of the plant by farmers for added income.

◆

BRITAIN MISSING MANY PAPER ARTICLES

Britishers have experienced a complete disappearance of the more familiar articles made from paper, according to Edwin C. Jahn, professor of forest chemistry at the New York State College of Forestry, Syracuse University, who has visited in London and now is in Sweden. Professor Jahn states that napkins, handkerchiefs, paper ornaments, and many other items are no longer available.

He writes, "The letter the Britisher receives is usually sent in a reused envelope having a war economy label to cover the old address. The importance of saving and recovering paper is impressed upon the British people by posters, newspapers, radio, exhibits and motion pictures. Exhibits and pictures show the military uses of paper, such as its place in making shell cases, parts of shell fuse assembly, tubes to be filled with explosives, demolition containers, grenade tubes, section of a wing of a mosquito bomber showing paper and plywood in combination, and many objects of laminated paper treated with resin, including mechanical and electrical parts for gun controls, airplanes, ships and tanks.

"The Britisher's newspaper is only a fraction of its former size and he is lucky to get one. When he buys an article in the store he must carry his purchase home unwrapped. A pipe smoker must bring a container when he buys tobacco."

◆

NEW ADDITION PLANNED FOR FLORIDA P. & P. CO.

A $1,000,000 addition scheduled for completion in June will greatly increase the capacity of the Cantonment, Florida, plant of the Florida Pulp and Paper Company, according to announcement December 30 by J. H. Allen, president.

The plant, which is located a few miles north of Pensacola, opened in August, 1941, with a production of 60 tons a day. Mr. Allen said this was doubled with perfection of operations and elimination of bottlenecks, and that the addition will raise the capacity to 180 tons a day.

Mr. Allen further announced that the addition will increase the company's annual payroll, now $1,085,000, by $300,000, and increase its demand for wood by 30,000 cords a year or about $250,000. It was also disclosed by Mr. Allen that he is starting a study of the manufacture of newsprint from Southern gum.

◆

▶▶▶ POSTWAR EXPANSION plans of the Marathon Paper Mills, Menasha, Wisconsin, have resulted in the recent purchase of an additional 6½ acres of land. This property, which is bounded by the C&NW Railway and the lower Fox River, was formerly owned by the Menasha Woodenware Company.

◆

IMPORT RULINGS

Customs officials have decided that shipments of envelope paper to a St. Louis consumer are dutiable as paper not specially provided for, denying the claim of the importer that the paper is dutiable at the lower rate for printing paper. The paper was of three types, all containing paper cuttings. One was of kraft pulp and white clippings, another of sulphite and white cuttings, and the third of unbleached sulphite and Manila clippings. The question whether the proper duty rate was for printing paper, for wrapping, was submitted to the Import Committee of the American Paper Industry which believed that the paper was neither of these

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Hard Nevillac · Soft Nevillac · LX-483 Nevillac · Nevillac 10°

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These phenol-coumarone-indene resins, (the last two listed are viscous liquids) because of their unusual compatibility and plasticizing properties, are being widely used in the manufacture of:

ADHESIVES

Waterproof
Optical
Shoe
Food Packaging
Pressure sensitive

PAPER COATINGS

Ordnance wrap
Waterproof
Greaseproof
Army Rations (outside)

MISCELLANEOUS

Laminating Varnishes
Artificial Leather
Leather Finishes
Army Raincoats
Paints and Varnishes
Printing and duplicating inks

NEVILLAC RESINS are soluble in alcohol, hydrocarbons, ketones, esters, ethers and chlorinated hydrocarbons. They are compatible with most synthetic resins including cellulose esters, and ethers, vinyl acetate, vinyl butyral and zein (corn protein) and partly with vinyl acetate and chloride copolymer.

They are not under allocation but require AA priority ratings to effect shipment. Write us for further information and samples.

A-10

THE NEVILLE COMPANY

PITTSBURGH · PA.

Chemicals for the Nation's War Program

BENZOL • TOLUOL • XYLOL • TOLUOL SUBSTITUTES • CRUDE COAL-TAR SOLVENTS
HI-FLASH SOLVENTS • COUMARONE-INDENE RESINS • TERPENE RESINS • TAR PAINTS
RUBBER COMPOUNDING MATERIALS • WIRE ENAMEL THINNERS • DIBUTYL PHTHALATE
RECLAIMING, PLASTICIZING, NEUTRAL, CREOSOTE, AND SHINGLE STAIN OILS

grades, and the rate was fixed at 30 per cent. The paper was made in Canada.

Shipments of sulphite bond from Canada, claimed by the importer to be dutiable as printing paper at one-fifth of a cent per pound and 5 per cent, was held for duty as writing paper at 3 cents per pound and 15 per cent. A shipment of light weight paper entered as printing paper has been classified for duty as bible paper at 2 cents per pound and 10 per cent.

Another question involving Canadian paper is whether victory kraft, consisting of 95 per cent kraft and the balance of other fibre is dutiable as kraft paper at 20 per cent, or whether the Finnish reciprocal trade agreement fixing this rate on kraft paper only applies to paper with 100 per cent kraft content.

◆

A NEW BIBLE PAPER

Among the recent technological advances in papermaking is the development of a fine book paper which does away entirely with the necessity of finger-moistening in turning the pages. This may not appear to be a very extraordinary achievement — until the *modus operandi* is demonstrated. When the book is opened, all the pages seem to be competing for the reader's attention; they repel each other in such a manner that it is only necessary to release the pressure and up pops the next page. The new paper was especially developed for use in printing Bibles by the Oxford University Press, and is called *Nema*. It is more than 30 per cent thinner than Oxford India, developed some years ago by the same British firm, and for which some of the materials originally came from India.

Canadian interest in the new product arises from the fact that for the first time in history the Bible (King James version) is now being printed in that country.

◆

MAY USE PRISONERS OF WAR IN MILLS AND WOODS MICH. & WIS.

Prisoners of war, lake seamen and former loggers will be working in Wisconsin and Michigan woods and paper mills in considerable numbers, if plans laid by the WMC and approved by Army authorities are carried out.

The return to employment of several hundred loggers and paper mill employees who left their jobs within the past two years, already has been accomplished. It is anticipated that four hundred prisoners of war will be put to work as soon as weather permits, these to be followed by an additional 800 within a month or so.

If carried to completion, the entire program will go far in alleviating the present acute paper shortage.

◆

"HISTOMAP" OF RELIGION XMAS GREETING OF KVP

The thirst of humanity for better, more spiritual things is a favorable sign of the times. No more fitting Christmas greeting could have been chosen than the "Histomap of Religion" sent to its customers and friends by the Kalamazoo Vegetable Parchment Company, Parchment, Michigan.

The "Histomap" outlines in graphic form the origin and evolution of religion considered in its widest sense. Included are not only the principal world religions, but also faiths in magic and "spirits" of Nature, and the worship of "gods" or symbols of tribal unity from the painted fetish of the jungle primitive to the Swastika of the Nazi-State-worshipper of today.

◆

FORESTRY AND ITS PLACE IN POSTWAR REHABILITATION

Addressing the Victoria, B. C., section of the Canadian Society of Forest Engineers at a recent meeting, Chief Forester C. D. Orchard spoke on "The Place of Forestry in the Postwar Rehabilitation Program."

Mr. Orchard stressed two functions of rehabilitation: first, the immediate provision of work when a surplus of manpower occurs; and second, the future reestablishment of returned men and war workers. "The first requirement must be met by the government," Mr. Orchard said, "and the second, mainly by industry, with help from the Government. Planning of rehabilitation work has reached the detail stage and is based upon accurate information." The manpower and equipment necessary to the consummation of these plans, and costs relative to same, all have been worked out, and approximately 4 million man-days of work per year laid out in detail.

◆

40 PUBLIC FORESTERS EMPLOYED IN NEW YORK TIMBER WAR PROJECT

Approximately 40 public foresters of Federal and State agencies have been organized to form the new Timber Production War Project, which is now operating in New York State to increase the production of lumber, pulpwood, and other forestry products. The project is financed by the United States Forest Service, with the co-operation of the War Production Board.

The foresters are from the Conservation Department, Soil Conservation Service, the United States blister rust agents, members of the faculty of the New York State College of Forestry and the State extension foresters in Cornell.

These trained men will assist small and large forest products industries by supplying information that will offset as far as possible the bottleneck in labor and in obtaining equipment, and materials. They also will explain to sawmill owners and woods operators how deferments for woodsmen can be obtained.

◆

MINNESOTA NOW DEVELOPING TREE PLANTING MACHINE

A tree planting machine is being developed by Minnesota's Division of Forestry in an attempt to carry forward the work of tree planting in that state, now imperiled by the manpower shortage.

According to H. G. Weber, director of forestry, plans for the machine are based on tobacco and celery planting equipment which has proved successful in other states. Under former methods, only about 1,000 trees per day could be planted by one man. It is claimed that the new machine, which is expected to be ready by early spring, will enable three men to plant 10,000 to 12,000 trees per day.

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▶▶▶ THE AXIS PRESS states that the paper situation in "Croatia" (Yugoslavia) has become difficult. The paper factory at Zagreb has found it impossible to work at capacity due to a lack of raw materials and semimanufactured products. (From *Foreign Commerce Weekly*.)

◆

EXTENSIVE POSTWAR RESEARCH PLAN UNDER WAY AT POWELL RIVER

An extensive postwar plan has been organized by the Powell River Company, Powell River, British Columbia. This plan already has gone into operation and is having the attention of specialists headed by the company's control superintendent, I. H. Andrews.

The plan is not confined to local chemical fact-finding; rather it embraces a wide program of research into the conservation of raw materials, continuity of supply for the years to come, markets, and other factors. Already extensive experimentation is being conducted in the field of plastics, particularly the production of "hard plastic products" from waste sulphite liquor.

CUTTING *cardboard*

AT 400 FEET PER MINUTE ON SKF

More than 90 SKF Bearings reported for duty on cutting cylinders and other vital locations when this 115" Duplex Continuous Rotary Cut-Off was designed. Since then every one of them has seen active service fighting Friction, breakdowns and delays.

While this machine cuts off sheets from which shipping containers are made for fighting forces at the rate of 400' per minute, SKF's insure the almost effortless rotation of vital turning parts—today, tomorrow, and for years to come. Veterans of millions of revolutions, SKF Bearings all through the Paper Industry are giving a good account of themselves in the War Effort.

5448

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SKF - EQUIPPED

Cut-Off

Built by Samuel M. Langston Co., cuts sheets for containers in which supplies are sent to the armed forces.

NEW HORIZONS !

• The impact of peace will be great. Conversion and adjustment to pre-war production and competitive markets present difficult problems. Executive skill of the highest degree must be exercised to permit no gaps of lost effort. Truly a momentous task lies ahead for those who direct the paper industry of this nation.

This step, however, will be taken with confidence. A confidence that is deeply rooted in their minds and hearts. Defined it is this--that the integrity and resourcefulness and the products of the Bagley and Sewall organization will be theirs to command. Over a half century of service to the paper industry by this company has built an enviable reputation of accomplishment and service unequalled.

THE BAGLEY AND SEWALL COMPANY : WATERTOWN, NEW YORK

BEEF LIVER DELUXE
presented a papermaking problem

Wrapping a piece of liver is a simple operation . . . but it represents a challenging problem solved by cooperative "know-how" in the paper industry.

Ordinary butcher's paper once permitted seepage of juices from meats and liver. Special "blood-proof" paper, on the other hand, was too slippery to handle easily on calender or reel, too slippery to remain neatly stacked in the butcher shop.

In cooperation with the paper mills, Hercules paper specialists looked for the source of trouble—found it in the type of size being employed. A new kind of size was developed—imparting superior resistance to slipping . . . *doubling* the resistance of butcher's paper to blood leakage from liver. . . making butcher's paper easier to manufacture and use than ever before.

Hercules experienced papermaking specialists are ready to help you with your important papermaking problems.

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PI-40

"Why shouldn't I buy it? I've got the money!"

Sure you've got the money. So have lots of us. And yesterday it was all ours, to spend as we darn well pleased. But not today. Today it isn't ours alone.

"What do you mean, it isn't mine?"

It isn't yours to spend as you like. None of us can spend as we like today. Not if we want prices to stay down. There just aren't as many things to buy as there are dollars to spend. If we all start scrambling to buy everything in sight, prices can kite to hell-'n'-gone.

"You think I can really keep prices down?"

If you don't, who will? Uncle Sam can't do it alone. Every time you refuse to buy something you don't need, every time you refuse to pay more than the ceiling price, every time you shun a black market, you're helping to keep prices down.

"But I thought the government put a ceiling on prices."

You're right, a price ceiling for your protection. And it's up to you to pay no more than the ceiling price. If you do, you're party to a black market deal. And black markets not only boost prices—they cause shortages.

"Doesn't rationing take care of shortages?"

Your ration coupons will—if you use them wisely. Don't spend them unless you have to. Your ration book merely sets a limit on your purchases. Every coupon you don't use today means that much more for you—and everybody else—to share tomorrow.

"Then what do you want me to do with my money?"

Save it! Put it in the bank! Put it in life insurance! Pay off old debts and don't make new ones. Buy and hold War Bonds. Then your money can't force prices up. But it can speed the winning of the war. It can build a prosperous nation for you, your children, and our soldiers, who deserve a stable America to come home to. Keep your dollars out of circulation and they'll keep prices down. The government is helping—with taxes.

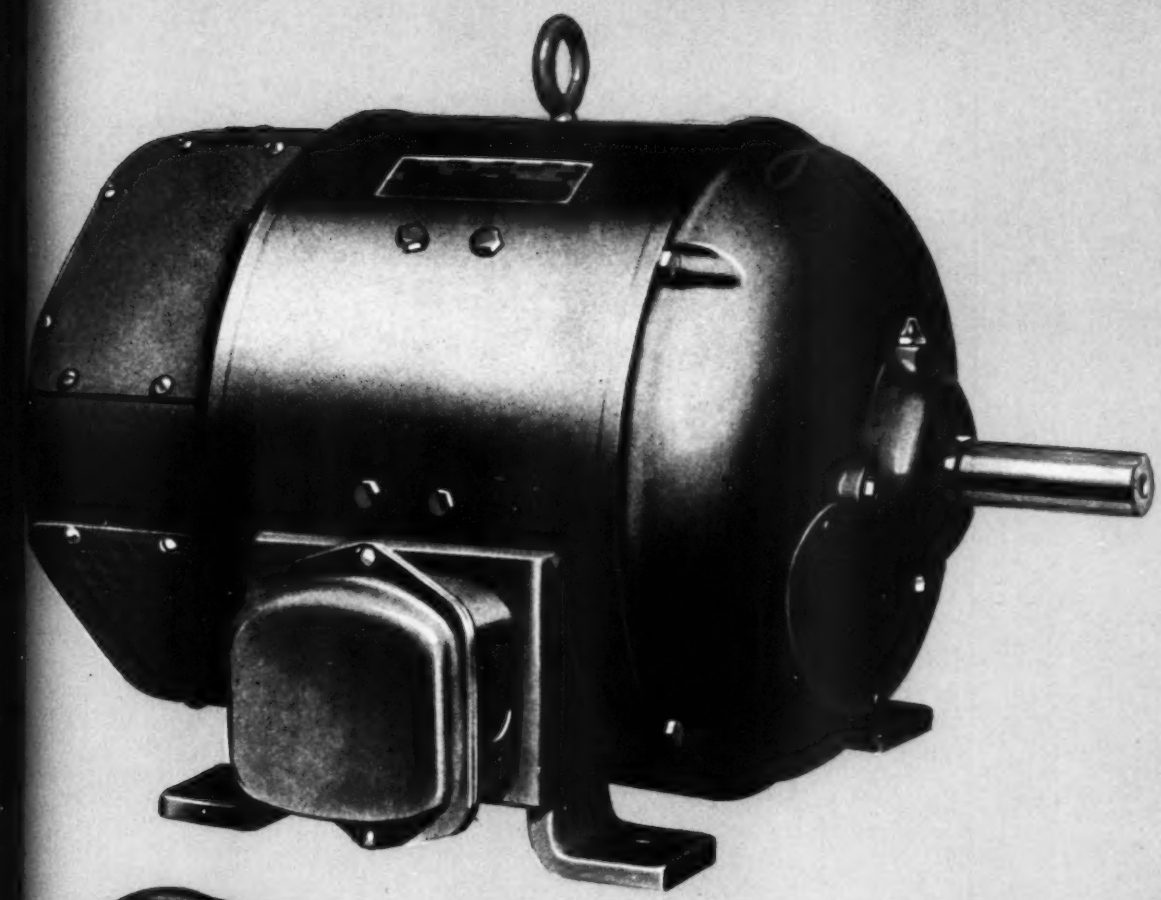
"Now wait! How do taxes help keep prices down?"

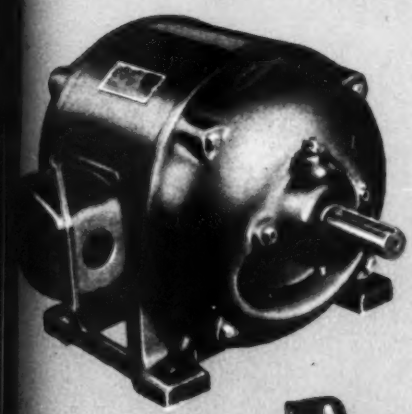
We've got to pay for this war sooner or later. It's easier and cheaper to pay as we go. And it's better to pay more taxes NOW—while we've got the extra money to do it. Every dollar put into taxes means a dollar less to boost prices. So . . .

Use it up . . . Wear it out . . .
Make it do . . . Or do without

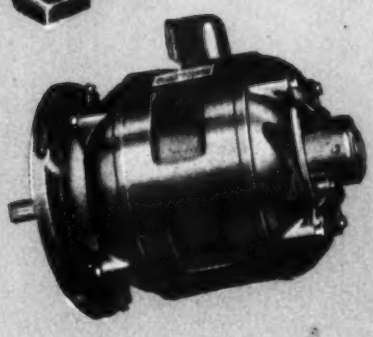
HELP US KEEP PRICES DOWN

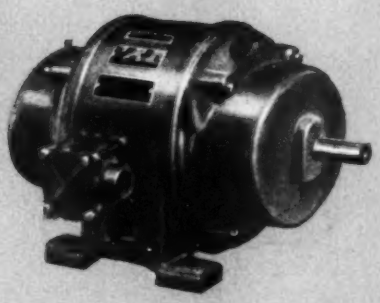
A United States war message prepared by the War Advertising Council, approved by the Office of War Information, and contributed by the Magazine Publishers of America

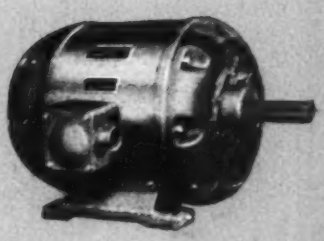




There is a size and type ***LOUIS ALLIS*** *electric motor for every industrial requirement.*







THE LOUIS ALLIS CO., MILWAUKEE 7, WIS.

Take Motors for Instance—

We are reading a lot these days about the miracle of RADAR — how it is helping our boys WIN this war — sinking Jap ships eight miles away in pitch darkness — blasting enemy planes out of the air —

When Radar was taken out of its swaddling clothes and sent to war — the Army turned to Louis Allis for dependable electric muscles to power these miracle units —

It was a Louis Allis powered Radar unit that first detected the approach of planes at Pearl Harbor.

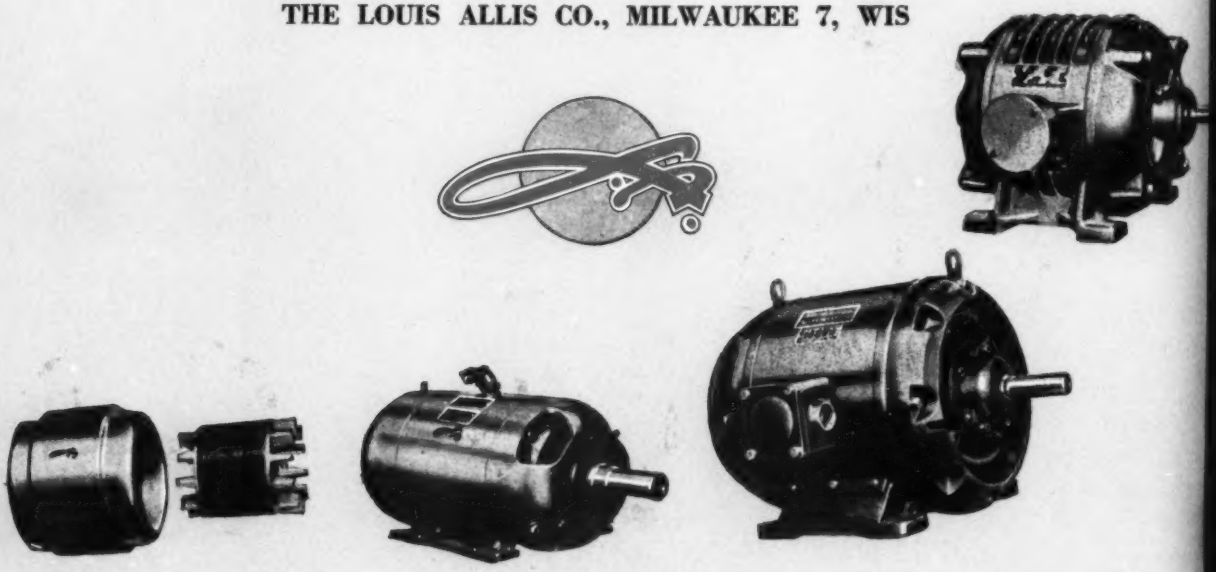
The U. S. ship that blasted thirty-two attacking Jap planes from the sky in less than that many minutes did it with the aid of Louis Allis powered Radar controlled guns.

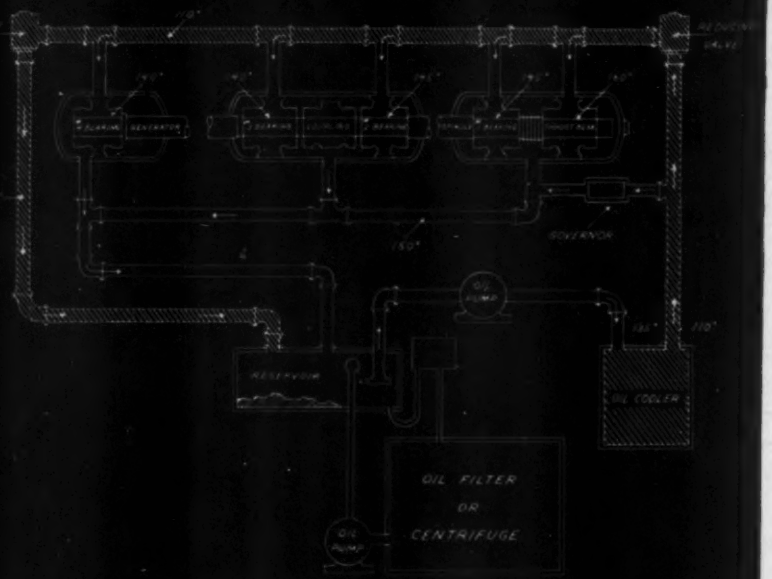
Our engineering development department has created many outstanding — if not revolutionary — improvements in electric motor design — construction and performance — as our share in helping win this war as quickly as possible.

Many of these important new motor developments will also play an important role in the post war period.

If you are planning a post war product that will require a special electric motor in its construction, our engineering development department will welcome the opportunity of working with you — just as soon as Uncle Sam does not require our full capacity.

THE LOUIS ALLIS CO., MILWAUKEE 7, WIS





Turbine temperature variations . . . Figures given are illustrative rather than actual. They indicate temperature variations that may exist in a typical turbine lubrication system. Oil decreases in ability to hold solids in solution and allows deposits to settle out in the cooler-parts, indicated by ▨ shaded areas.

Turbine Oil Sludge —a cause and cure

• BASIC CAUSE of sludge is a "thirst" for oxygen on the part of certain petroleum hydrocarbons. When they get it, they form asphaltenes or acids.

The presence of asphaltenes may not become immediately apparent, because of their solubility in hot oil. But as their concentration increases, they can no longer all be held in solution. Also, some of them become less oil-soluble because of chemical changes. Eventually they deposit in the cooler parts of the turbine, such as oil coolers, pump screens, oil lines and filters. Deposits also occur at points of low velocity, such as in governors, bearing pedestals, and where centrifugal force operates, as in couplings. Sludge is composed, in part, of these deposits.

The acidic substances also end up in the sludge, but first they gradually attack the metal in the system to form metallic soaps. From this point, you find the same pattern as with the asphaltenes—solubility in hot oil . . . increasing concentration of soaps . . . decreasing solubility . . . deposits in cooler parts . . . sludge.

Obvious answer. It is evident that sludge trouble can be minimized by removing or neutralizing the two principal types of substances which cause it. The acid-forming hydrocarbons cannot be removed by any process we know of, but they can be held in check if natural oxidation inhibitors are left in the oil. Unfortunately, the same process that removes the asphaltene-formers also takes out the natural inhibitors.

Therefore, conventional turbine oils are a compromise . . . some of the asphaltene-formers are removed, but not so many as to remove all the natural inhibitors.

Nonpareil is different. We take out *all* the asphaltene-formers . . . even though the natural inhibitors go out with them. To *restore* these, we add a patented inhibitor . . . which renders the acid-formers harmless. Thus, Nonpareil becomes the one turbine oil without asphaltene-formers and with the acid-formers neutralized.

Guaranteed in writing. A clue to Nonpareil's remarkable freedom from sludge is its low acidity in service. Accurate records on hundreds of turbines, after 10 to 15 years of operation, show that Nonpareil's acidity (as expressed by neutralization number) may be expected to be about 0.05—without batch treatment, resting or replacement. In fact, Nonpareil is sold with our written guarantee that its neutralization number will never exceed 0.15 for the life of your turbine. Use Nonpareil and your turbine-cleaning days are over.

Get all the facts. A Standard Lubrication Engineer will gladly furnish details, service records, and further proof. Phone, or write your nearest Standard Oil Company (Indiana) office, or 910 S. Michigan Ave., Chicago, Ill. In Nebraska, address Standard Oil Company of Nebraska at Omaha.

NONPAREIL
TURBINE OIL

Oil Is Ammunition . . . Use It Wisely

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING

Ever See a D. H. in ACTION?

A Dilts Hydrapulper "plows" through 100 tons of mixed papers in just about the same fashion that a Sherman Tank wipes out a nest of "super-men."

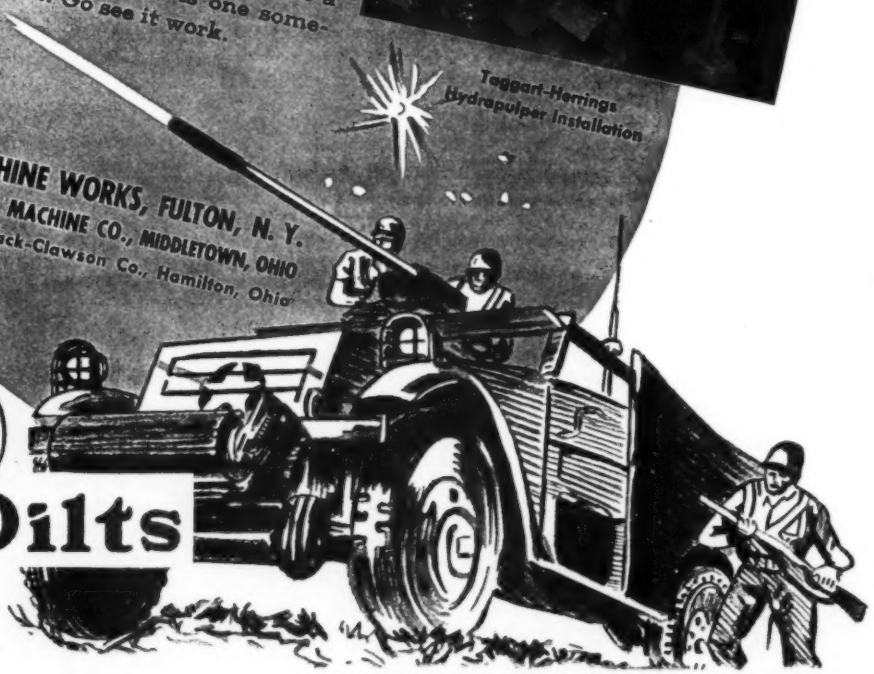
It takes full bales of mixed papers, wires and all, in one fell swoop. It handles consistencies up to 6% with ridiculous ease. It pulps fast, thoroughly and uniformly.

It takes entire rolls of virgin pulp with equal ease. Scores of Hydrapulpers now in service. Plans for others already made. Time to plan yours . . . any capacity required.

We repeat the question . . . "Ever see a D. H. in Action?" There is one somewhere near you. Go see it work.

Teggart-Herrings Hydrapulper Installation

DILTS MACHINE WORKS, FULTON, N. Y.
SHARTLE BROS. MACHINE CO., MIDDLETOWN, OHIO
Divisions of Black-Clawson Co., Hamilton, Ohio



SHARTLE Dilts

. . . . . Editorial . . . . . .

A Victorious New Year

▸▸▸ THE PEOPLE OF THE UNITED STATES are convinced that the War against the Axis powers is won.

The President of the United States says so.

Prime Minister Churchill of England says so.

General Marshall says so.

General Eisenhower says so.

The smashing offensive of Russia on the Eastern Front is convincing.

The miraculous mobilization of the all-out production forces of this country back of the Allied Forces on every front is final and conclusive evidence.

The people of this land are therefore entitled to look ahead into this New Year with confidence. The only question in their minds is, will the termination of hostilities come suddenly?

We think not, for we believe that as military operations proceed, it will become evident that no armistice is possible because the terms laid down by the Allies to all belligerents are "Unconditional Surrender."

The Axis powers will not surrender. They must be mopped up.

No armistice would mean sudden cessation of fighting, with the consequent demobilization of millions of men.

The mopping-up process has not yet reached its peak. It possibly will be reached this year. Thereafter, a gradual tapering-off process will ensue. Men will be demobilized by the thousands rather than millions, thus enabling the industrial transition from war-to-peace economy to proceed in an orderly and constructive manner. Therefore, the return to peacetime industrial activity in no way will be comparable to the industrial convulsion which followed the Armistice in World War I.

The people of this country who in the space of twenty-four months have mobilized so efficiently their productive forces for the winning of the War, are now justified in laying plans and perfecting specifications for the post-war period.

The time required for the mopping-up process is the important factor. Presumably it will be the end of 1945 before the Axis is finally liquidated. If that eventuates, the transition from war to peace will hold no terror of economic convulsion as an aftermath of the War.

More Paper from Wastepaper

▸▸▸ THE PULP AND PAPER INDUSTRY of the United States has traveled a rough road since the outbreak of the War.

In the first place, government officials prognosticated a serious paper shortage for 1942. This prediction proved harmful. It stimulated a wastepaper campaign that flooded the wastepaper market. More wastepaper was collected than consuming mills at the time could use within a reasonable period.

Although ceiling prices had been established for wastepaper, the market was so dull that dealers took advantage of the situation. They offered such low prices to householders and various civilian organizations for stocks collected by them that the average citizen became disgusted and quit saving wastepaper. It was only in communities where an adequate proportion of the ceiling price for wastepaper was paid by dealers that collections continued satisfactorily.

The lengthy delay of the Government to recognize the essentiality of the pulp and paper industry to the war effort, due in part at least to self-complacency within certain quarters of the industry itself, brought added trouble to the mills. The draft took many employees; others enlisted; and still others found employment in more lucrative war industries. As a result, when the essentiality of the industry became recognized, a manpower shortage had been created within the industry.

Now, at the beginning of 1944, the industry is faced with diminishing inventories of both pulpwood and pulp. According to the Forest Products Bureau of the War Production Board, these inventories have been diminishing for the past 14 months and are now at a minimum level for practical operation.

To meet this acute situation, the War Production Board program, in a release dated December 24, 1943, calls for the production of a minimum of 1,398,837 tons of paper and paperboard to be produced each month during the first quarter from 837,060 short tons of pulp.

The same release also states, "The paper and paperboard industry, through the exercise of its ingenuity and enterprise, should be able to find ways and means of relieving the shortage of pulp and should produce quantities of paper and paperboard in excess of those stipulated in the program determination."

Is the industry equal to this challenge? We believe that it is.

The industry has ample machine capacity to meet every military and essential civilian requirement. Likewise, the manpower shortage at the mills (at least in part) has been met nobly by women. The pulpwood situation likewise has been improved by the Victory Pulpwood Campaign and other promotional activities. More papermaking fiber, however, is needed.

What cannot be obtained by cutting pulpwood can be obtained from wastepaper. Another salvage drive is under way. Do not let it go the way of the first.

In the past, wastepaper has found its larger outlets in the production of paperboard and book—principally paperboard.

With an increased collection of wastepaper as a result of the present drive, it is reasonable to expect a supply in excess of normal industry requirements. Here is where paper mills, which previously have used only virgin pulp, can prevent a recurrence of a flooded market with its incident demoralizing influence on the public and at the same time can increase their supply of fiber and thus paper production by using wastepaper in admixture with such virgin fiber as they have available to them.

It is understood that some of these mills already are using wastepaper but much more can be done. Start now to "cut your coat according to your cloth," and when Father Time rings out 1944 he will be able to say of your mill operations, "Well done."

1944 Will Reward Planners

▸▸▸ IMMEDIATELY FOLLOWING WORLD WAR I, all America went into such a slump that one of the bright copy boys working for the *Chicago Tribune* had a sloganistic inspiration and coined the phrase "1921 Will Reward Fighters." By that he meant that the only way to get out of our business depression was to "fight" as we had fought during the war which had only recently ended.

That slogan was the expression of national hindsight. It would have been much better to have exercised foresight and two years earlier to have said: "1918 Will Reward Planners," since had they planned for the postwar period of adjustment they would have done much to prevent widespread unemployment and heavy losses in depreciated inventories.

It is only very recently that business leaders, administrators, and journalists have been able to speak out on plans for winning the peace without incurring severe public criticism on the ground that they were diverting attentions from the more immediate necessity of defeating our enemies. Today, however, an ever increasing number of people are recognizing the grave probability of widespread unemployment during the early postwar period unless some effective plans are made to prevent it.

It is interesting to look back to the last war. Records show that a few people anticipated the unemployment which was certain to follow the end of the war, but that they failed to accomplish anything constructive to guard against it. Most of their agitation occurred during September and October of 1918, although the war, even then, was more than four years old. Then, as now, many recognized the eventual need for preparing postwar work, but likewise they assumed there was plenty of time. It was during September, 1918, only two months before the Armistice, that President Wilson assured Edward A. Filene of the U. S. Chamber of Commerce, who had asked the President to establish a committee to study military and industrial demobilization, that he hoped "to address myself to that matter very soon."

During October, 1918, Bernard M. Baruch, then chairman of the War Industries Board, complained that talk about peace plans was "affecting our output and making difficult diversion of labor from nonwar to military purposes." "As long as we are at war we must think war, talk war, and make war," he said. However, two weeks later (early in November), Baruch called a meeting of state councils for defense to discuss industrial and economic reconstruction. That action brought a protest from Secretary of War Newton D. Baker, who wrote the President that such a meeting was premature. The President agreed, and told Baruch "to forestall any discussion of reconstruction." The following week the Armistice with Germany was signed.

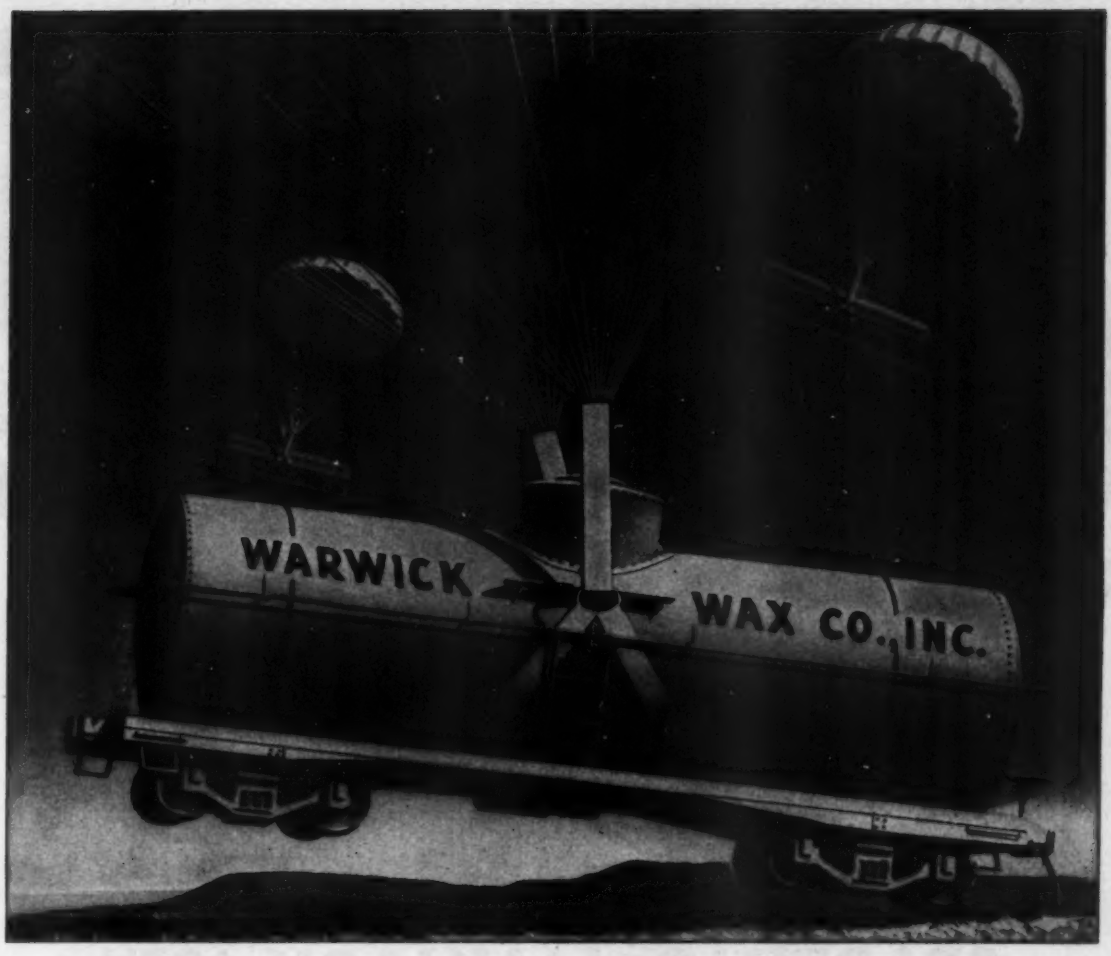
And then, all hell broke loose, economically speaking. Within six weeks nearly five billions of dollars' worth of war contracts had been cancelled—with no previously established system of balances or checks to make for an equitable burden either on management or labor. Within those six weeks more than 500,000 men had been demobilized, and throughout the spring of 1919, this soldier demobilization continued at the rate of between 60,000 and 75,000 men a week—with no previously established plan for their re-employment into constructive industry. Far and away the greater majority of industrial leaders willingly accepted the return of their former employees, although to do so meant financial loss to them because of the lack of war contracts and no adequate provision for reconversion to peacetime production. Even so, hundreds of thousands of men got out of their uniforms and into "civies," only to find themselves enlarging the rapidly growing army of unemployed.

Today we are facing another armistice. Like the one which ended the hostilities of World War I, it, too, may come unexpectedly. But whether it be "just around the corner" or a year or two distant, there is no time to lose in formulating a sound plan for the demobilization of our industrial and military forces upon which depends the economic welfare of 135,000,000 Americans. True, many more agencies are now engaged in developing postwar plans than existed during the last six months of 1918. There is far wider appreciation of the need for, and less objection to, a demobilization program than in 1918. But still there is no completely unified plan, no centralized agency, small evidence of teamwork or unanimous thinking among the groups which eventually will be most affected by a program-less demobilization. Even among the planners of the present war, we are assuming that time is on our side, and I maintain that time is by no means on our side, even though the armistice may be delayed until 1945 or 1946. However severe the first world war, it was a picayune affair compared with the present one.

From the Administration's standpoint, postwar demobilization plans will doubtless involve gigantic public works. But a giant program of sound and needed public works cannot be developed over night or with a simple twist of the wrist. Nor, much less, by the appropriation of huge sums of money—as the events of the past decade (the attempts of the PWA, CWA, CCC, WPA, etc., still fresh in the minds of every American) will fully testify. Worthwhile public works programs require months of preparation—for advance engineering surveys, blueprints and specifications, acquisition of land, etc. Regardless of when hostilities cease, there is no time to lose in formulating a centralized, unified, responsible plan, with its necessary agencies for emergency dispatch.

From the standpoint of private industries, postwar demobilization plans necessarily will be predicated on individual plants and products. What will be each manufacturer's step-by-step procedure in the task of reconversion? What will be the method of disposal of present war-item machinery? What will be the method of disposal of present war-item inventory material? Exactly what new machinery will be required for the production of future peacetime products, and how (and with what dispatch) will it be procured? What interim will be required to dismantle the present war-production plant and reconvert it to a peacetime production plant, and how will it be secured? What new products will the individual manufacturer produce for the coming peace; what new markets will he invade?

The successful demobilization of both the military and the industrial forces is largely the responsibility of the Government. But don't forget—*you* also have your own individual part to play in that trying period.



TO THE RESCUE OF WAX USERS

The new, modern manufacturing plant of our affiliate, Western Wax Company, is ready to fill your wax requirements.

WIRE • PHONE • WRITE

Warwick Wax Co., Inc.

580 FIFTH AVENUE, NEW YORK CITY

A Subsidiary of Warwick Chemical Company

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Impregnole Water Repellent • Luminous Pigments • Metallic Stearates • Metallic Resinates
Petroleum Waxes • Sulfated Oils • Synthetic Detergents • Textile Compounds • Wetting Agents

STARTING JANUARY 18TH

IT'S UP TO YOU!

STARTING January 18th, it's up to you to lead the men and women working in your plant to do themselves proud by helping to put over the 4th War Loan.

Your Government picks you for this job because you are better fitted than anyone else to know what your employees can and should do—and you're their natural leader. This time, your Government asks your plant to meet a definite quota—and to break it, *plenty!*

If your plant quota has not yet been set, get in touch now with your State Chairman of the War Finance Committee.

To meet your plant quota, will mean that you will have to hold your present Pay-Roll Deduction Plan payments at their peak figure—*and then get at least an average of one EXTRA $100 bond from every worker!*

That's where your leadership comes in—and the leadership of every one of your associates, from plant superintendent to foreman! It's your job to see that your fellow workers are sold the finest investment in the world. To see that they buy their share of tomorrow—of Victory!

That won't prove difficult, if you organize for it. Set up your own campaign right now—and don't aim for anything less than a 100% record in those *extra* $100 bonds!

And here's one last thought. Forget you ever heard of "10%" as a measure of a reasonable investment in War Bonds under the Pay-Roll Deduction Plan. Today, thousands of families that formerly depended upon a single wage earner now enjoy the earnings of several. In such cases, 10% or 15% represents but a paltry fraction of an investment which should reach 25%, 50%, or more!

Now then—Up and At Them!

Keep Backing the Attack!—WITH WAR BONDS

This space contributed to Victory by THE PAPER INDUSTRY AND PAPER WORLD

This advertisement prepared under the auspices of the United States Treasury Department and the War Advertising Council

Complete OIC Valve Service

OIC complete Steel, Iron and Bronze Valve service is as near to you as your nearest OIC Distributor. It's a service supported by sixty years of experience and Valve specialization.

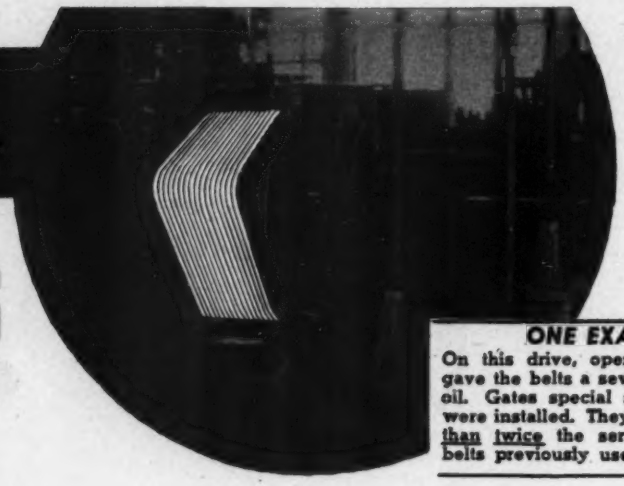
There is an OIC ***Distributor Near You. Call him or write to us for complete information on*** OIC ***Steel Valves.***

THE OHIO INJECTOR COMPANY

WADSWORTH, OHIO

Quality Leaders in Valve Manufacture Since 1883

For More Than
5 YEARS—



ONE EXAMPLE
On this drive, operating conditions gave the belts a severe soaking with oil. Gates special synthetic V-belts were installed. They are giving more than twice the service life of any belts previously used.

GATES V-Belts Made Entirely of *SYNTHETIC Rubber

Have Been Wearing *2-Times* to *3-Times* as Long as ANY *Natural Rubber* Belt on Drives where *Heat* and *Oil* Conditions are *Especially* Severe!

Five years before there was any warning of a rubber shortage, Gates was already supplying American Industry with thousands upon thousands of V-belts made entirely of SYNTHETIC rubber.

***A very special synthetic rubber was chosen by Gates. This synthetic had not been developed as merely a "substitute" for rubber. In certain important applications it is greatly superior to natural rubber. Under severe conditions of heat and oil, for example, the Gates special synthetic V-belt in hundreds of plants is actually outwearing belts of natural rubber by as much as 230%!**

This long record of success in making V-belts of synthetic rubber stands unrivaled in the rubber industry. No other maker of V-belts has had anything approaching Gates' experience and proved success in this field.

This is particularly important to you now. The time has come when Gates' superior "know-how" in the making of synthetic rubber V-belts can be put to work for you right in your own plant.

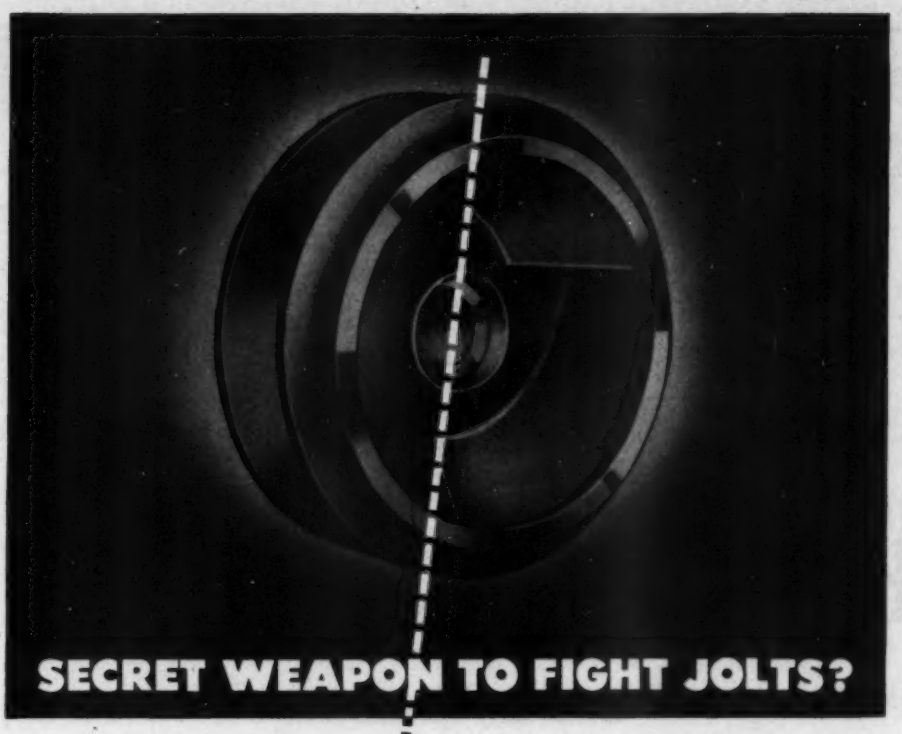
You have only to look in your telephone directory and call the Gates Field Engineer. He will put at your service the full benefits of Gates' knowledge and experience without the slightest obligation.

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO, ILL. 549 West Washington
NEW YORK CITY 215-219 Fourth Avenue
ATLANTA, GA. 738 C. & S. National Bank Building
LOS ANGELES, CAL. 2240 East Washington Boulevard
DENVER, COLO. 999 South Broadway
DALLAS, TEXAS 2213 Griffin Street
PORTLAND, ORE. 333 N. W. 5th Avenue
SAN FRANCISCO, CAL. 1090 Bryant Street

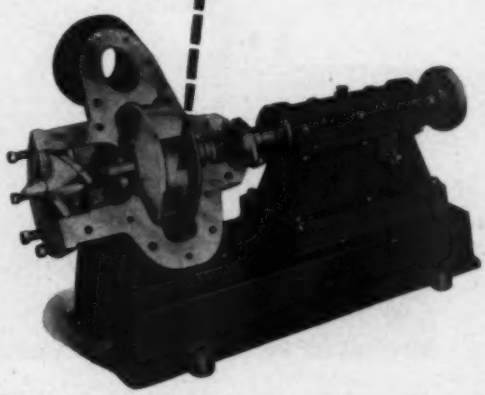


SECRET WEAPON TO FIGHT JOLTS?

An effective weapon it is, to fight the jolts inflicted on an ordinary pump by the sudden and often frequent changes in paper stock consistency.

It's the "Buffalo" Impeller—part of all "Buffalo" Paper Stock Pumps—but no secret to mill operators who depend on this improved "Buffalo" construction.

For 20 years these impellers have been turning in unusual service records. Due to their design—few vanes, large inlets, heavy shrouds and because their operation does not depend on close-running clearance for high efficiency, "Buffalo" Impellers handle high consistency stock without clogging or wedging—and with a minimum of wear. In fact, paper stock flows through a "Buffalo" impeller as readily as it does through a pipe!



Regardless of the nature of your stock or the head, there's a "Buffalo" Pump with a correctly designed "Buffalo" Impeller to handle the job. Engineering data on request.

BUFFALO PUMPS, INC.

213 Mortimer St. Buffalo, N. Y.

Canada Pumps Ltd., Kitchener, Ont.

"Buffalo" PAPER STOCK PUMPS

COTTRELL PROCESS

of

ELECTRICAL PRECIPITATION

universally recognized as a
standard method of removing

DUST, FLY ASH, FUME, MIST & FOG

***from* GASES**

•

30 years of research, development and operating experience
throughout the world are incorporated in the

COTTRELL INSTALLATIONS

offered to meet the requirements
of any problem by

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NEW YORK CITY

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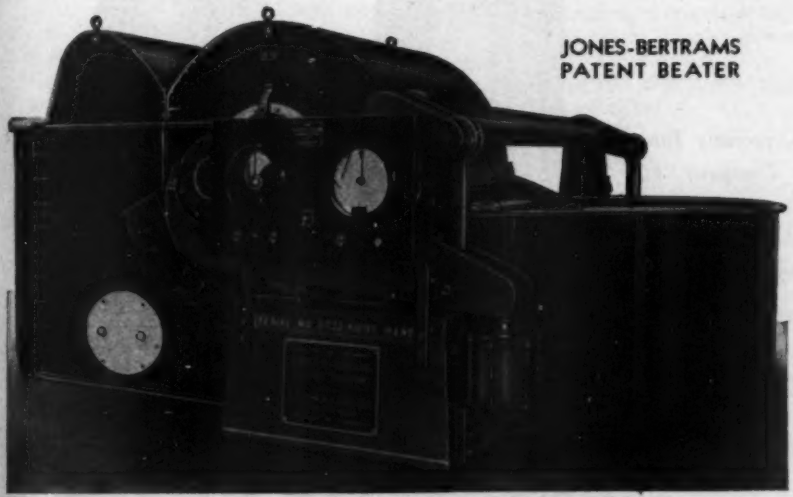
CHICAGO, ILL.

How Quickly can we get a

JONES-BERTRAMS PATENT BEATER?

Will this occur in your mill after Victory is Won?



JONES-BERTRAMS
PATENT BEATER

For tomorrow's planning, look around your beater room today. You should consider now just what new beating equipment you will need. And it will pay you to investigate the Jones-Bertrams Beater which has already demonstrated its value in many mills, and on many grades, throughout the country. Let a Jones' sales engineer give you the pertinent facts, or write for booklet "A Study of the Beater."

Jones

GEARED FOR WAR PRODUCTION

E.D. JONES & SONS COMPANY-PITTSFIELD, MASS.

Builders of Quality Machinery for Paper Mills

Ryertex Better for Forming Boards

No size limitations.

Won't warp, split or crack.

Lasts longer.

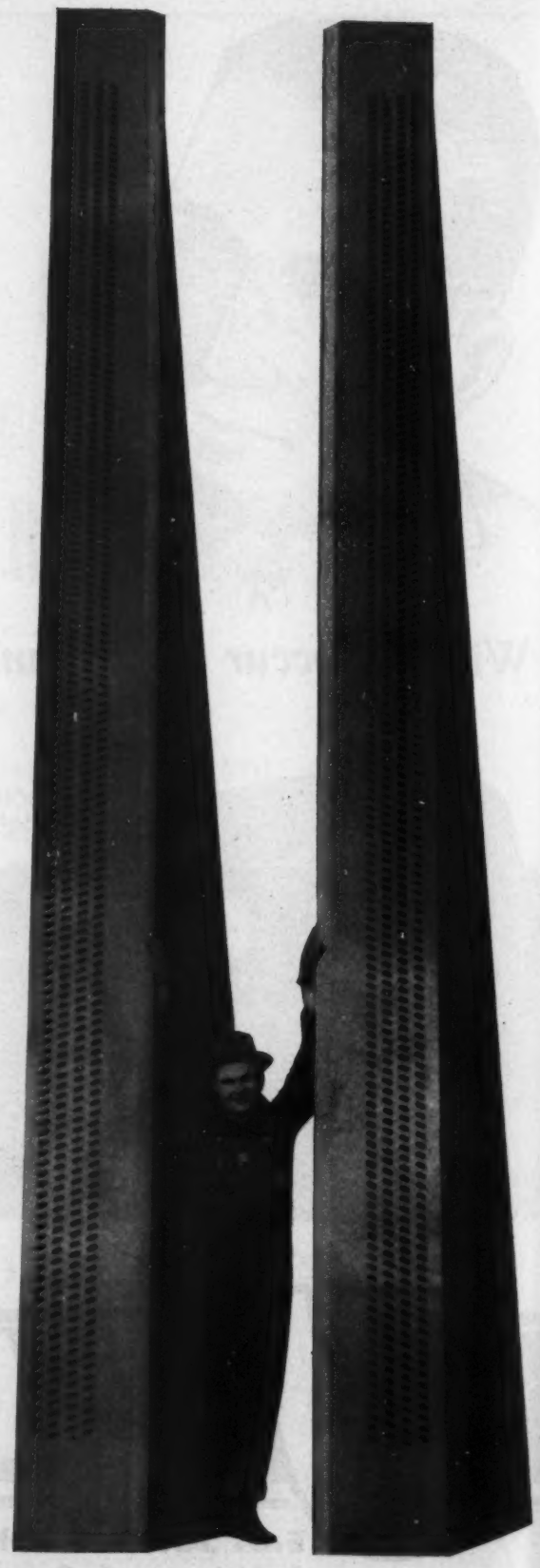
Stronger than wood or rubber.

Easily resurfaced.

The design of these forming boards, recently furnished to the Maine Seaboard Paper Company, at Bucksport, Me., called for an unusual material. Each board is 1" thick, 18" wide and 255" long. Each is punched with 604 slots and has a 2" bevel.

Ryertex was selected for the job because this laminated resin and textile composition has great strength and, with water lubrication, possesses an unusually low coefficient of friction. Complete uniformity and freedom from any tendency to warp or splinter were other important reasons for using Ryertex.

For more efficient operation in your mill use Ryertex for forming boards—for suction box covers; doctor blades; bearings on press rolls, calender stacks, beaters, jordans, grinders, bleachers, jack ladders, etc. Ryertex will do a better job. Send for detailed information.



RYERTEX

A product of **JOSEPH T. RYERSON & SON, INC.,** Chicago and Jersey City

Practical Steps in War-Peace Conversion

ROBERT H. WELLS, President
Corrigan, Osburne & Wells, Inc., Management Consultants

▸▸▸ POSTWAR PLANNING for the past six months has resembled Mark Twain's weather: everyone has been talking about it and no one has done anything about it. Undoubtedly, this is due to a misleading conception caused by placing emphasis on the future and planning possibilities rather than on the present and actual conversion operations. For this reason, our staff has refused to sanction the term and has consistently used in its place the more expressive phrase, "war-peace conversion." In our judgment, the job of changing over from war to peace production is much more than a future potentiality—it is an actuality which is here right now and it isn't "post" any thing.

Of course, the outstanding reason why there has been more talking than doing is that executives of both large and small companies are extremely busy. There can be no let-down in the tremendous production drive, but an important part of that drive is observing where you are going and especially having your employees know that they are driving toward a future and not a dead-end. Plans can be made and a course plotted that will aid rather than interfere with your war production.

The first step in effective war-peace conversion is, as with any production change, to take inventory. Not only an inventory of facilities, materials, parts, and stocks but of the business as a whole. What did you have in plant equipment, personnel, finance, and markets before the War? What have you now? What will you need when V-Day comes?

Products

Can you continue making a war-product for peace markets?

If not, will you return to making your pre-war product?

Will it still be acceptable to buyers?

Will you have to improve its design or engineering?

Could you use new and better and possibly lower-priced materials?

Will you have to develop new products?

Plants

Will your present plant be too large or too small in relation to sales potentials?

Will you need new equipment?

What about new manufacturing methods developed by competition during the War?

Is your plant layout up-to-date?

Are your finances adequate to tide you over the cancellation-reconversion period?

Have you set up large enough reserves for depreciation and obsolescence?

How long will retooling take and can you speed up the process?

Can you keep all your present work force employed?

Will your sources of materials and parts be prepared to supply quotas needed at the required time?

Are your controls over production and sales costs efficient?

Markets

Where will you sell your postwar product?

Will you have to find new markets?

What volume can you sell yearly?

Can you readily assemble an adequate sales force?

Is your prewar sales force available?

Are the products of your industry on an upward or downward sales trend?

Are your prices competitive?

Is your profit-margin adequate?

Distribution

Will you sell your postwar product through pre-war outlets?

Are your former dealers in sound shape?

Can you distribute more economically through new outlets?

Have public buying habits changed?

Is there need to revise trade discounts?

Could packaging be improved?

Will your advertising and merchandising programs be sound and adequate and progressive?

In the paper industry, more than in any other, there continues the specious belief that "we can go back where we left off." Perhaps there is a vague consciousness that packaging of all kinds has changed radically. True, paper as a whole has benefited, but it is a wartime condition, manufacturers are all considering new packaging when the war is over. Many others are planning to attack this important outlet of paper. The glass, metal, and plastic container manufacturers are moving in on it now. Some of paper's outstanding features, such as lightness and low cost, are now claimed by others. Every field for paper is vulnerable to some degree due to new materials, technologies, and facilities.

The paper machinery field is in greater jeopardy than paper alone. We know definitely of two firms; well equipped and financed, who are planning to enter this field. Reputation and loyalty to friends carry a great deal of weight in the paper machinery business but competitive conditions are going to make lower quotations attractive to the point where some business will be lost. The most dangerous competitor, even though short-lived, is the one who is unfamiliar with the problems of the job.

For every new development that tends to reduce the use of paper, the industry must have a sound answer. To do this, two things are required.

First—A group within the industry or an organization trained in such work must keep fully informed of developments *outside* the paper industry that will have any direct or indirect effect on the use of paper.

Second—Another group or an organization must develop new uses, new technologies, and new markets within the paper industry.

The equipment manufacturers must take immediate steps to retain and strengthen their position with the paper mills. It is not too soon to start surveys of needed equipment and replacements. Estimates and proposals can be prepared with certain open items to be determined later according to the labor rates and material costs at that time. →

Both paper and equipment manufacturers have a difficult internal problem in each individual company, and that is the reestablishment of a "cost consciousness." Cost, production, and inventory controls must be established or improved to meet competitive conditions. Production must be on the most efficient basis possible. *Now* is the time for the installation of these central procedures even if actual cost reductions cannot be obtained at this time. Firms with money to spend for improvement can find no better way to use it than in this "putting your house in order." Facilities cannot generally be purchased or improved and the present tax picture coupled with high volume makes the net cost of these internal improvements in management very low.

Too much emphasis cannot be placed upon the urgency of sound, down-to-earth, postwar planning. This country is only begging to gear up for the greatest industrial comeback of the century. In our considered judgment, industry in the United States is on the threshold of a period of expansion without precedent or parallel in previous history. As set forth in our recently issued special analysis, *Getting Down to Earth on Post-War Work*, we envisage:

1) The end of hostilities in Europe in the winter of 1944

2) Six months of slowdown in early 1945

3) Three years of a prodigious domestic replacement boom from 1945 to 1948

4) Then two years of serious setback followed by a world rehabilitation boom which will provide the greatest ten years of prosperity from 1950 to 1960 which this country will see in this century.

A start has been made. Much remains to be done, particularly by the great body of manufacturers. We have the greatest opportunity of the century before us—and the greatest responsibility. Management is equal to the task. If it will rouse to the imminent need for action; if it will take advantage of the informed and wise counseling that first-hand contact with war production has made available for peace production; there is no question this country will be placed on a solid footing.

Frankly, we believe that management will measure up to the requirement. And the paper industry unquestionably will recognize its opportunities and take the necessary steps to fit itself for participation in the forthcoming swingback which in all probability will prove to be the greatest this generation will witness.

The Theory of Adhesion

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▶▶▶ FOR MANY YEARS the theory, nature, or the fundamental cause for adhesion has been the subject of much controversy and discussion. Why should one type of glue make a strong bond with paper and not with metal, or vice versa? Such questions have gone unanswered, and in spite of the fact that glues and adhesives are used in the paper industry in enormous quantities, very little work has been done with this subject.

The history of glues and adhesives is an interesting one, and dates back to the days of the pyramids when the Egyptians used adhesives to preserve mummies. Pliny mentions the making of adhesives in his writing and even goes so far as to point out the best method of making adhesives in those days.

Patents were taken out in England in 1639 for wall paper which soon developed in a paste-hanging method. However, it was not until 1841 when an envelope which could be sealed without wax was produced, and in 1842 the first gummed stamp was put out by a private City Dispatch Post in New York. But it was not until 1847 that the United States put out gummed stamps, and after going through the history of adhesives, it seems that the new development of adhesives took place because of the necessity that was created for them by the paper industry. The use of glues and adhesives has increased several fold in the past few decades. In the past few years since the outbreak of the War, packages of all types other than paper have been slowly disappearing from the market, and paper packages have come to replace them. Many items which until a few years ago were shipped in wooden or metal containers and retailed in bulk are now put up in small individual paper packages and shipped in paper shipping boxes sealed with gummed paper tape or some adhesive. The importance of glues and adhesives to the paper industry easily can be underrated, as is often the case.

On the subject of adhesion there seem to be two schools of thought: (1) the mechanical theory, which holds that joints are held together by mere imbedding of the glue or adhesive into the surface pores of the materials joined, and (2) the specific theory of adhesion, which holds that some other force must be operating.

In the modern conception of the nature or the function of an adhesive, there seems to be little room for the mechanical interlocking of the joined surfaces and the glue or adhesive. There are several cases as in the woodworking industry where mechanical interlocking does occur and may even add to the strength of the joint. But this is not the fundamental cause for adhesion. It must be remembered that any rough surface offers a larger area for the adhesive to come in contact with, and, hence, increases the strength of the bond. If the mechanical theory worked properly, then any number of materials (the surfaces of which were of equal porosity) should make bonds of equal strength with a given glue or adhesive. We know this is not true for we can make an extremely strong bond between two pieces of glass blocks with animal glue, while we only get a very weak bond between two pieces of steel with the same adhesive. Animal glues do not make bonds of any appreciable strength with metals, Bakelite, painted or lacquered surfaces. McBain and Hopkins (*1*) obtained in a few cases bonds which attained a strength of two and one quarter tons per square inch in both tension and shear. These joints were made with shellac cements between smooth metallic surfaces.

Crow (*2*) working with soft solder, obtained joints of eleven tons per square inch if the films of solder were very thin. In this case, the tensile strength of the joints was several times that of the solder. It is an estab-

lished fact that bonds can be made with a certain adhesive which will have a tensile strength several times the tensile strength of the adhesive used. The advocates of the mechanical theory are at a loss to explain adequately how this is possible and how highly polished surfaces can be bonded

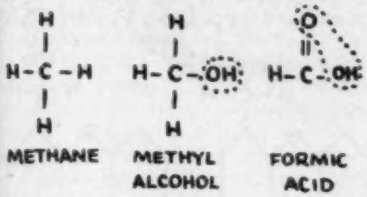

Figure 1

and have a high tensile and shear strength, because the mechanical theory is inadequate. We must, therefore, look further into this problem and examine the facts and forces which are at work in glues and adhesives. To merely name this phenomenon *specific adhesion* will not suffice, although thus far very little more has been done. It is quite generally agreed that the forces of physics and chemistry work according to fundamental law and order, and not in an irregular hit or miss fashion. If an advanced theory does not cover all cases and conditions, the theory may be inadequate or incomplete. No attempt is made here to imply that the theory of specific adhesion as herein stated is complete in every detail, for such theories are few and far between. But we should continue our researches and piece together new bits of evidence as they are uncovered so we may either advance new ideas or strengthen the ones we now hold.

We are all well aware of the fact that there is no universal glue or adhesive to fill every need. Only certain specific adhesives will make strong bonds or joints with a particular substance or material, as already pointed out, and when we examine the fact we find that when an adhesive makes a strong bond with material there is a similarity in the molecular structure of both the adhesive and the adherend, as will be discussed at length later.

The scope of this article does not permit going into a detailed discussion of the molecular theory, but according to the modern concept of this theory, the center of the field of the electrical forces may or may not be coincident with the center of the mass of the molecule. If we examine a molecule of methane, we find that it is symmetrical and that the center of its field of electrical force is coincident with the center of its mass. However, in methyl alcohol and in formic acid this situation no longer exists. In methyl alcohol, the center of the field of force is centered around the OH group, and

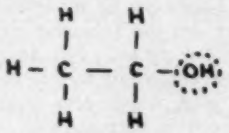

Figure 2

in the case of formic acid, it is centered around the COOH group. We also find that the molecules of methyl alcohol and formic acid are not structurally symmetrical, and that the oxygen atom or atoms as the case may be, is only partially neutralized by its adjacent atom with which it is in chemical combination. Although the molecule itself may be electrically neutral, some residual force does exist within the molecule. In the hydrocarbon methane, the molecules exert very little influence on one another. The low physical constants for methane seem to bear this out. In the case of methyl alcohol, the physical constants are substantially higher and the physical constants for formic acid are still higher (Figure 1).

Ethyl alcohol may be considered as made up of a molecule of methane containing no residual field of forces, and a molecule of methyl alcohol with a residual field of forces centered in

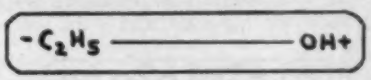

Figure 3

the neighborhood of the OH group (Figure 2). This compound is known as a polar compound. In other words, a polar compound is one in which the atoms and atomic grouping (of which the molecules are composed) set up electrical stresses across the molecule which give rise to potential difference. Compounds containing O, OH, COOH, CO, COO, CHO, CN, NO_2, NH_2, $CONH_2$ groupings are of the polar type, while the hydrocarbons represent the nonpolar compounds.

In the hydrocarbons the individual atoms are bound together in such fashion that no free energy exists within the molecule. As a result, these molecules cannot exert any appreciable influence on one another. They are, therefore, free to move; they have low boiling points, low surface tension, etc. In the case of polar compounds, there is a tendency to association among the molecules due to influence

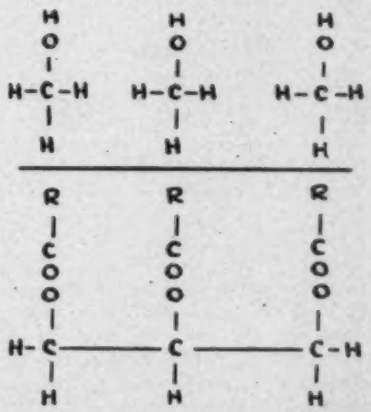

Figure 4

that is exerted by virtue of their unbalanced energy. Water, for instance, which is highly polar, would be a vapor at temperatures at which it actually is a liquid, were it not for the free or unbalanced energy existing within the water molecule.

We may consider polar compounds as built up of two portions, an active and an inactive portion. In the case

TABLE 1

	Latent heat of vap. gr. cal. per gram	Solubility in water	B. P. °C	X	Y	X/Y	Dipole Moment (X 10^{18})	
Methanol	284.29	∞	64.0	17	15	1.133	1.68	
Ethanol	204.26	∞	78.5	17	29	.586	1.70	
1—Propanol	164.36	∞	97.2	17	43	.397	1.66	
1—Butanol	141.26	7.9^{20}	117.7	17	57	.298	1.65	
1—Pentanol	120.17	2.7^{22}	137.9	17	71	.239	.....	
1—Hexanol	109.80	$.59^{20}$	156.4	17	85	.200	1.60	
1—Heptanol *	104.88	$.09^{18}$	176.3	17	99	.171	1.71	
1—Octanol	97.47	s.s.	195.5	17	113	.150	1.68	
1—Nonanol *	93.00	ins.	213.0	17	127	.133	1.60	
1—Decanol *	90.00	ins.	231.0	17	141	.120	1.60	

*Calculated

of ethyl alcohol, according to Jordan (*3*), we may consider the C_2H_5 as the inactive and the OH as the active. Diagramatically, this interpretation may be represented as in Figure 3. Between the active and the inactive groups there exists a tension or stress. This tension is known as the dipole moment according to Debye (*4*) and in the case of ethyl alcohol is (1.70×10^{18}).

If we consider x as the active portion of the molecule, and y the inac-

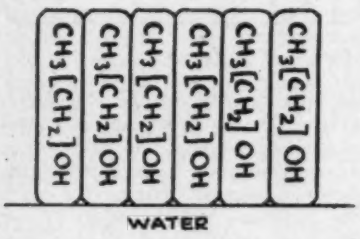

Figure 5

tive, we may use the expression x/y as an index of degree of polarity. On examining Table I we find that the higher the alcohol, the lower the polarity. This, however, is not due to a decrease of the unbalanced energy of the active group, but is due to the fact that the active portion of the molecule is comparatively small, and the inactive group is very large. In the homologous series of alcohols containing a straight carbon chain, the longer the chain the less soluble the alcohol is in regard to polar solvent; such as water, and when such a solvent and solute are brought together, an interface between the two compounds is formed if both are in the liquid state. When this happens, like groups attempt to approach one another; that is, active groups try to approach active groups, and the inactive group tries to approach the inactive on the other side of the interface. If both compounds have active groups which are relatively large as compared with their inactive group, then the two liquids mix freely. If, however, the inactive group of one of the compounds is comparatively large, they do not mix (or mix only slightly) because there is not sufficient attraction between the molecules. If the surfaces of methanol and linseed oil are brought together, an interface is formed and the compounds do not mix. This is due to the fact that in linseed oil the active COO groups are very small as compared with the inactive portion of the molecule. In this case, the molecules of each compound are oriented in such a way that their inactive portions are adjacent to each other, as illustrated in Figure 4, and the liquids do not mix.

In the case of N-decanol, the OH is just as active as the OH group of methanol. However, N-decanol is not soluble in water because there is not enough attraction between the water and the OH group to draw the long hydrocarbon chain into the water. As a result, the N-decanol molecule becomes oriented on the surface of the water, as in Figure 5.

Solids, as well as liquids, may be of a polar or nonpolar class. Metal, some plastics, and solid hydrocarbons are nonpolar; while glass, paper, linens, cotton, wood, and other cellulosic materials are polar. If about 100 cc of benzene (which is nonpolar) is added to about 200 cc of water in a 400 cc beaker, and a glass and a metal rod inserted into the liquids, it will be observed at the interface that the metal rod draws the benzene down into the water; while the glass rod raises the water into the benzene, as illustrated in Figure 6.

In practice we also find that no strong bonds can be made unless the adhesive and the adherend are of the same polar nature. No doubt there are some exceptions to this rule, such as fish glue, which does make bonds of appreciable strength with materials which are only weakly polar. We must admit, however, that we do not know the chemical composition of fish glue, and it is by no means a simple substance. In the case of paper and animal glue, we have ideal materials for making a strong bond if the proper

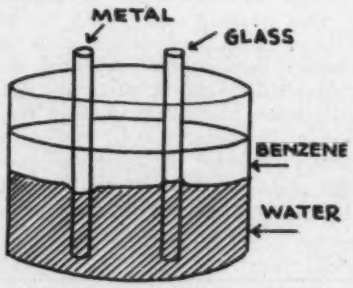

Figure 6

procedure is followed. In addition to its ether linkages, the cellulose molecule (Figure 7) has OH groups sticking out all over it, making it strongly polar. Although we do not know the structure of the molecule of animal glue, we do know that there are COOH and NH_2 groups present, and that these groups must be sticking out of the molecule in a three-dimensional fashion.

Cellulose Molecule

Urea-formaldehyde glues, starches, and dextrine and others belong to the polar class, and, as a result, make strong bonds with polar substances. Water, which is strongly polar, will make a very strong bond between polar material when it is in the solid state (frozen), but will make only weak bonds with nonpolar materials under the same conditions.

Thus it follows that in specific adhesion the molecular attraction between the adhesive and the adherend is responsible for the strength of a particular joint or bond. Van der Waal

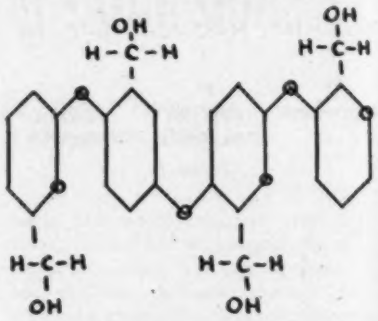

Figure 7

calls the forces which are active between molecules "The forces of cohesion;" Meyer and Mark (*5*), "Molcohesion." At first, Van der Waal and others considered the forces acting between molecules to be relatively small, but the tremendous attraction that exists between molecules in a glue joint or bond does not agree with this concept. The fact that certain compounds will decompose rather than be forced into the vapor state on the application of heat seems to disprove this concept further. In such cases, the intermolecular attraction is greater than the forces which are responsible for the existence of the compound. These forces of intermolecular attraction may be calculated indirectly from the latent heat of vaporization. They, in turn, may be calculated (*6*). However, the heat of vaporization of polar compounds is more difficult to calculate than that of nonpolar compounds. Some polar compounds do not fit into the picture as they should from the thermodynamic considerations.

In this article much attention has been given to compounds seemingly unrelated to adhesion, in order to treat the subject from a chemical basis and to show how the function of adhesion fits into the picture.

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Steam and Electric Power Co-ordinated to Speed Log Debarking

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The Reliance Electric & Engineering Company

▸▸▸ EQUIPMENT THAT USES a high-pressure stream of water to debark cleanly and quickly a variety of sizes and kinds of logs, and which constitutes the largest hydraulic log barker in existence, is being operated with a combination of steam and electric power by the Weyerhaeuser Timber Company at its Pulp Division in Everett, Washington.

This combination of steam and electric power has proved so successful that, with less than a year's operating experience, the output originally thought possible has been nearly doubled, passing all expectations.

Heretofore, the logging industry has favored steam power almost exclusively. In many respects, the strength of steam equipment and capacity of the medium to withstand unpredictable shocks and overloads are well suited to such rugged operations.

Steam, however, lacks the nicety of control inherent in electric power. It was apparent during the early development of the Weyerhaeuser log barker that the entire sequence of its heavy operations would have to be subject to fact and exacting control from a central source.

This led to Reliance being given a contract to supply electrical equipment required for the log barker. Engineers of the Clark Controller Company of Cleveland, Ohio, were asked by Reliance to devise the necessary unified program control. Meanwhile, Reliance concentrated on the development of special electric motor drives which would co-ordinate with the steam power retained for certain of the operations and make such control system possible.

Beyond fulfilling this requirement, the various electric drives installed have proved capable of the wide range of torque, heat dissipation, and stamina necessary to handle twice the duty cycle originally intended.

As first planned, one log was to be debarked every 45 seconds. In slightly more than a year, this average operating cycle has been reduced to 24 seconds and, at times, to as little as 20 seconds.

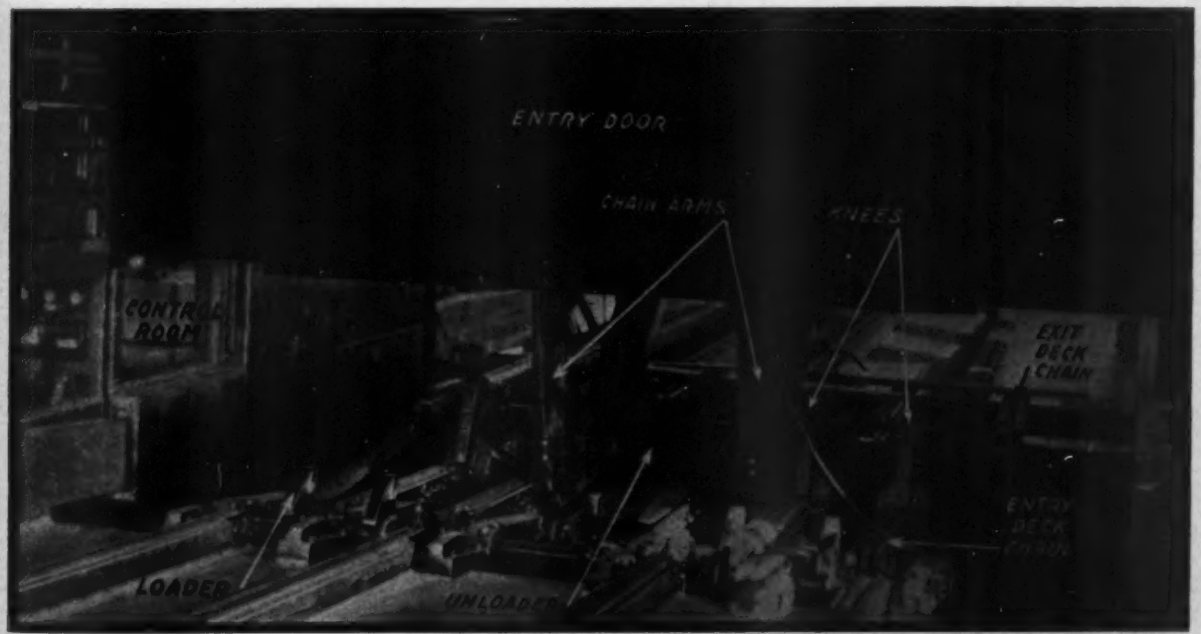
Principal element of the log barker is an 875-gpm stream of water, under pressure of 1,430 pounds. This is handled by twin nozzles, so adjusted that an 8-inch strip of bark is ripped off each time the twin nozzles travel back and forth under the log. It was first believed only a 4-inch strip could be removed.

The nozzles are propelled at the rate of 255 ft. per second, with half a second required to reverse their direction of travel at each end of the log.

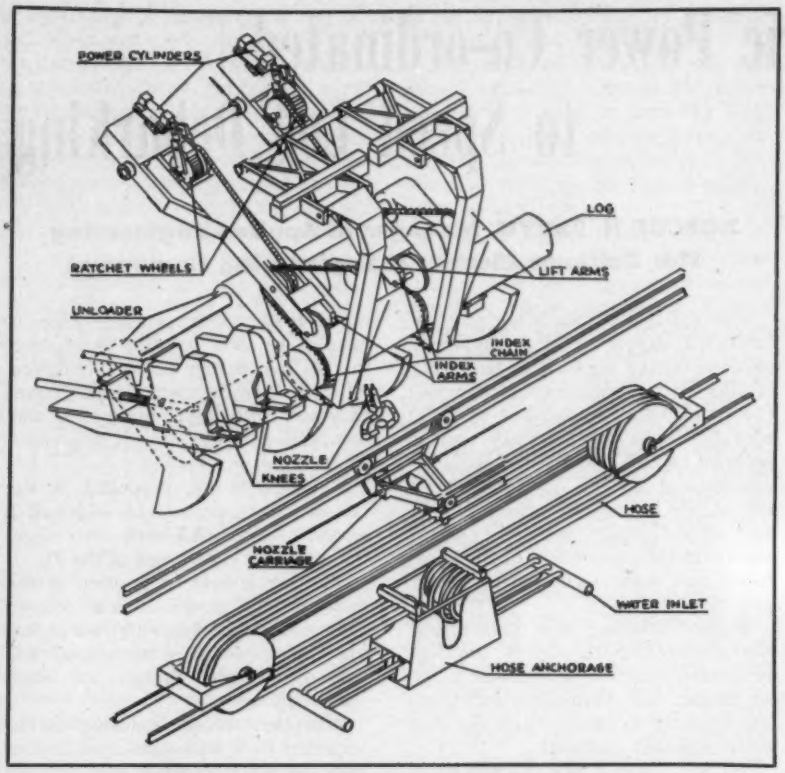
The log is held in position in the path of the nozzle, being secured against cast-steel knees by two indexing chains, which wrap around one side of it under pressure of heavy steel chain arms.

Movement of the indexing chains, imparted by a hydraulic cylinder, rotates the log a predetermined distance each time the nozzles reach the end of the log, to expose a new strip for debarking.

This process takes place within a debarking chamber, which confines the flying water and bark during the average period of 17.88 seconds required



Front view of the debarking chamber showing location and arrangement of the mechanism operated by co-ordinated steam and electric power. Logs of various kinds and sizes up to 26 feet in length, 40 inches in diameter and 12 tons in weight are stripped clean of bark with this equipment at the rate of one every 24 seconds.



Isometric drawing of the Weyerhaeuser hydraulic log barker.

for actual debarking. The remaining 6.12 seconds of the 24-second log cycle are needed to get the log out of the dabarking chamber and replace it with a new one.

The entire process is controlled by a single operator. He stands in a soundproof, glass-enclosed booth that gives him a commanding view of the entry and exit decks and of the debarking chamber itself.

When a counter on his control panel indicates that a given log has been cleanly debarked, he pushes a button on the top of his control desk. The hydraulic nozzles come to rest in an end zone, where the high-pressure stream will not interfere with the loading and unloading operations.

On depressing a thumb button at the top of his master control handle, entry and exit doors of the debarking chamber rise. The indexing chain arms are hoisted clear of the log and lift skids are raised to support it.

As the operator moves a master handle forward, hydraulic unloading arms boost the log over the steel knees, letting it drop to the exit deck chains, which convey it to the exit storage area.

After the unloading arms are returned, the operator depresses a foot switch and a new log is picked up from the entry deck and thrown onto the deck chains, which convey it into the debarking chamber.

In relation to the length and diameter of the new log, the operator uses push-button controls in his booth to select one of two pairs of knees to accommodate it and sets their position so that the bottom of the log will be directly over the travel of the hydraulic stream.

When the log comes to rest against the knees, the operator releases his master pushbutton, the chain arms drop to wrap the indexing chains securely about one side of the log, entry and exit doors of the debarking chamber close, and the lift skids lower to free them of interference with projections on the log during the course of its rotation.

As the master start button is depressed, the high-pressure stream returns from the end zone and begins the debarking operation.

When it is borne in mind that the hemlock, spruce and pine logs handled by this complex process may vary from 9 to 40 inches in diameter, from 12 to 26 feet in length, and weigh up to 12 tons, the power requirements for various sections of this equipment are better visualized. Further complicating the problem is the fact that logs are not regularly cylindrical but taper toward one end, may have bumps and other irregularities on their surface and are not necessarily straight.

As an instance, a log thrown onto the entry deck chains may be of such contour in relation to its weight as to offer unusual resistance to the 120-feet-per-second travel of these motor-driven chains. Otherwise, the Reliance motor installed for this operation would have been selected on the same basis as that considered when providing power for the average conveyor.

The entry chains are kept running continuously, whereas the exit chains operate only during the unloading period and while the exit doors of the debarking chamber are open. This was necessary to prevent bark and debris, picked up by the chains, from being piled against the exit doors when closed.

When first planned, it was intended that these chain motors be capable of handling a log once each 45 seconds. As currently operated, the duty cycle has been reduced to about half that interval.

From this it can be seen that conditions guiding the selection of the motors used for the various debarking operations are unusual in the electrical field. Inasmuch as their operation in service has proved successful to a degree exceeding expectations, specific data pertaining to certain of them is of value.

Among these are the motors used for indexing of the cast-steel knees. Each of the four knees weighs 2,000 lb. and moves on a 20-degree incline, with a maximum travel of 3 feet. This movement was to be accomplished in three seconds. Each of the four knees is equipped with a screw and nut drive, which requires six revolutions per second to meet this demand.

In computing the necessary torque, the 20-degree incline, modified by a .4 coefficient of friction and again reduced by 80 per cent efficiency from the screw and nut, were summed up in relation to the 2.39 radius of the screw to equal 365 lb. ft. This, when corrected for the mechanical advantage afforded by the screw lead of two inches for each traverse of its circumference of 15 inches, indicated a torque of 49 lb. ft. at the output gear shaft, or 15.8 lb. ft. from the motor itself when equipped with a 3.1:1 single-stage reducer. Average rpm required, therefore, was 360, allowing one-third second for acceleration.

This in itself would have constituted a comparatively exact requirement of the sort usual in specifications for electric drives. Illustrative of the wide range of performance essential to such operations in the logging industry, however, is the fact that at any time it might become necessary to change the indexed position of the log after it was secured against the knees,

to compensate for error on the part of the operator.

Incorporated in the Clark automatic program control for the entire log barking sequence is recourse to manual control, to give the operator a means of countering any such unusual conditions.

This made it necessary that the electric drive for each knee be capable of sufficient torque to move not only the weight of the knee, but in addition, one-half of a 12-ton log. Since 15.8 lb. ft. was capable of handling the 1-ton weight of the knee alone, through the given mechanical application, the weight of the knee, plus one-half the weight of the log, or 14,000 lb., would require 110.6 lb. ft. of torque.

To meet this over-all range, Reliance engineers selected a 365 NEMA frame for a motor having WR^2 of 6.4 lb. ft.^{2} To this the brake and gears added 5 lb. ft.^{2} To accelerate the motor, gear train and brake wheel in one-third second required 112 lb. ft. average torque. This, plus the output required for normal conditions, indicated a torque of 127.8 lb. ft. for acceleration, and a total of 238.4 lb. ft., without regard to acceleration, under operational extremes.

The high-torque, high-slip characteristics developed by the design of this fully watertight Reliance gearmotor made available 150 lb. ft. average accelerating torque and a maximum of 306 lb. ft.

The additional output was considered desirable in view of the vagaries involved in calculating the force necessary to move a jammed log, and also to allow ample heat dissipation in event frequency of the duty cycle should be increased.

Function of the chain arms and steel knees by which the logs are gripped in position and rotated for debarking by action of the 875 gpm hydraulic stream is illustrated here.

It was originally intended the motor be capable of maximum travel of the knees each 45-second interval. In slightly more than a year of operating experience, the cycle has been stepped up to as much as once each 20 seconds . . . a fact which amply vindicates the engineering decision to provide for a substantial excess output.

In this connection, it is worth noting that an exceptionally high service factor was allowed for the single-stage reducer gears.

For the entry and exit deck chains referred to earlier, NEMA frame 254 Reliance gearmotors have proved entirely satisfactory under all conditions of service.

These are interchangeable with motors which operate the lift skids. The skids, which receive the log from the entry deck chains and support it until it is gripped by the indexing chains, are moved by cam action. Each of the four skids weighs 3,340 pounds, is 5½ feet in length, and is supported by an eccentric three feet from the pivot.

In turning through 180 degrees, this cam lifts the skid 6 inches at the extreme end. Since the log it supports may weigh as much as 12 tons, the torque required at the came of each skid was computed to be 503 pound feet, requiring 1½ revolutions from the output shaft of the Reliance gearmotor, to which it is connected by a 3 to 1 chain drive.

This, with a 12 to 1 single-stage reducer, indicated a torque requirement of 9 pound feet average from the motor. This demand was arrived at by assuming the weight of the skid and log to be centered on the eccentric, with 1.57 used as the factor of efficiency.

Interval originally allowed for operation of the skids was one second in every 45-second cycle. This has been increased in actual service to 100 per cent.

In considering these various requirements, including the general ones pertaining to log handling, Reliance engineers selected the NEMA 254 frame and supplied a high-torque, high-slip, splashproof motor operating on 550 volts. This drive developed 80 pound feet of starting torque, with average acceleration of 33½ pound feet. Test data showed the average effective loss

Entire control equipment, consisting of photo relays, magnetic panels, limit switches, selsyns and brakes, is operated from this bench board in the sound proof control booth. Large plate glass windows bring the entire sequence of log handling and debarking within view of the operator.

per cycle of operation compared satisfactorily with the heat dissipation curve developed.

The variance between the 36 pound feet average demand computed and the 33½ pound feet average accelerating torque selected was judged satisfactory for operation of the skids on the basis of engineering judgment in this comparatively new field.

In well over 12 months of continuous operation, the 3-phase, 60-cycle Reliance gearmotor has handled this type of work, usually assigned to steam pistons, without failure or trouble.

Motors of the same type were installed to operate the exit and entry doors of the debarking chamber. These doors are 8 feet wide and 28 feet 9 inches long. They are made of 12 gauge fabricated steel channels covered with 18 gauge sheet iron, and were required to rise 6.9 feet in 1.4 seconds.

The problem here was similar to that of elevator operation, since the doors are counterbalanced with a 4,000-pound weight. The travel is converted to rotary motion by a cable and 15-inch drum, which requires 1.75 revolutions with a distance specified.

Four drums are provided for each door, and all four are mounted on a line shaft. The latter is chain-driven without reduction from the sprocket of a 12:1 gearmotor. Speed of 1,020 rpm is reached in 1.1 seconds, which was sufficient to meet the 900 rpm computed as necessary for this operation. Actual torque output of the motor absorbed in moving the doors was figured at 22.64 pound feet. While this was below capacity of the design, the selection of a motor that would be interchangeable with those which drive the deck chains and lift skids appeared preferable at the time and has proved advantageous in view of the fact that the doors now raise and lower more slowly than originally planned, although with twice the frequency.

The two steel arms, which support the indexing chains, weigh 1,250 pounds each. Since full application of the weight was necessary in order for the toothed chains to grip the logs securely, they could not be counterbalanced.

It was calculated that these arms would have to be raised 12 feet in 1.3 seconds. A splashproof, 1075 rpm Reliance gearmotor, utilizing a NEMA C-365 frame and capable of 30 minute duty with a 75 centigrade rise, was installed.

Class B insulation, including glass-taped coils and mica slot cells, was used to increase the power by 23 per cent by increasing the heat dissipating ability. This motor, equipped with a 7.3:1 single-stage reducer by reason of the fact that the load could not be lifted in a straight line, indicated that somewhere between 70 and 80 per cent full lift speed would be effective.

When this ratio was applied to a 20-inch drum, the necessary 2.28 revolutions were accomplished in approximately one second. To reduce this speed, the gear ratio of the motor was changed to 12:1. With this ratio the lift was completed in 1.2 seconds instead of 1.0 because of the change in torque applied.

Further operating experience led to the addition of an eternal reducer, which lowered the ratio to 24:1 and made it possible to raise both arms with one motor in 2.6 seconds by driving both drums from a common line shaft. They are power-lowered through the same distance in 3.2 seconds.

With exception of those that drive the entry and exit deck chains, each of the Reliance gearmotors supplied to operate the various parts of this hydraulic log barking equipment have friction drum brakes.

For all but the entry and exit door motors, these brakes are operated by rotating cam limit switches, which intercept the circuits and operate the brakes at the end of a pre-selected interval of operation.

The entry and exit door limit switches are mounted on the door frames and the brake effectively stops the movement within an 18-inch over-travel.

A Health Program for Pulp and Paper Mill Employees

JAMES D. STARK, Plant Physician
Hammermill Paper Company

▸▸▸ TOM JONES SAYS to the plant doctor, "I am having trouble with an acid stomach. It comes from the fumes in the sulphite mill."

Bill Smith says, "Doc, the dampness about the paper machine causes me to catch cold—I am always having a head or chest infection."

These two cases are but samples of the complaints the plant physician hears from the employees of a pulp and paper mill.

Is a man's work a causative or an exciting factor in his physical disability? It may be, but usually it is not. Certainly the usual case of gastric hypersecretion is more often the result of error of diet or a pathological state (gastric ulcer) rather than the inhaling of acid fumes.

How can such misconceptions be corrected? How can the health of mill employees be improved?

The company must realize that it has a marked responsibility. It must provide a proper place for each employee to work. When Utopia is reached, no acid fumes will be found in the sulphite mill; but now an effort should be made to keep drains, sewers, pipe connections, etc., in such shape that as few fumes as possible are present in the atmosphere. As long as there are a wet end and a dry end of a paper machine, there will be contrasting temperatures and a high humidity—yet proper ventilating will reduce some of the extreme discomfort and exposure of the paper mill employee. Drafts of cold air, improper protection of men working in exposed situations, and many other unreasonable conditions can be avoided or corrected.

All of such effort in a sincere program will not guarantee good health to the employee. He works but eight hours a day. The other sixteen hours are spent at home, at play, at the club, or perhaps four hours of it might be on a Victory shift. What are his habits during this period?

One principle of living long has been recognized as an essential of good health, and that is *modernization*. The second basic factor is *regularity*. *Common sense* might be added as a third factor.

All of the new ideas and theories—balanced diet, vitamin pills, cold inoculations—are of little or no value unless the above principles are carefully observed.

For these reasons, a program to promote good health should include the following:

1) Have proper working conditions.

2) Select the employee capable of doing the job assigned to him.

3) Keep an exact record of the cause of lost time due to illness. If an

employee is a chronic offender, send for him; ask him to have a physical check-up by his family doctor or the plant physician. The check on employees losing time is most important.

4) Encourage the supervisors to send to the Medical Department men who appear to be unable to do their work properly, men who seem to be slipping.

5) Personal conferences with the man frequently ill—both by the employment department and medical service. Is the man unhappy at work, at home, or has he some physical condition that might be corrected? Is he no longer able to handle his present assignment?

In such interviews, do not pass up the simple thing. What are the eating hapits of the man; does he get the proper rest; is he physically able to handle a Victory shift; does he suffer from chronic constipation, or recurrent sinusitis?

6) General efforts educational in type, pamphlets, movies, etc., are of little value if they are placed in the coat pocket of the male employee or presented in a movie shown at lunch hour. They are effective only in the hands of the wife or mother at home. The homemaker must be reached to change home environment—to secure balanced meals. Home visitation may be of value in small localities, but it is lost in cities. At the same time, this practice treads on dangerous ground—it invades a man's palace, his home.

The employees of any company are but a part of the local residents of the community where that plant is located. The influenza epidemic is not a selector of cases—as to where employed—what the individual may do. The average graph of illness in most plants will run a close parallel to that of its local community. Some reduction from the average might be found in plants where superior working conditions prevail; where the average intelligence of the employee is higher than others (yet, intelligence is not a perfect safeguard—wisdom is much better); where men are not overfatigued or overexposed.

It all reverts back to the early premise—good health is not "God-given;" it is not sold or served by the family physician or the corner drug-store. It is a state resulting from "right living," which may be practiced by anyone.

Adherence to these three rules will promote and maintain the best state of health: (A) Moderation of work, play, diet; (B) Regularity of work, rest, and elimination; (C) Common sense application of simple human actions.

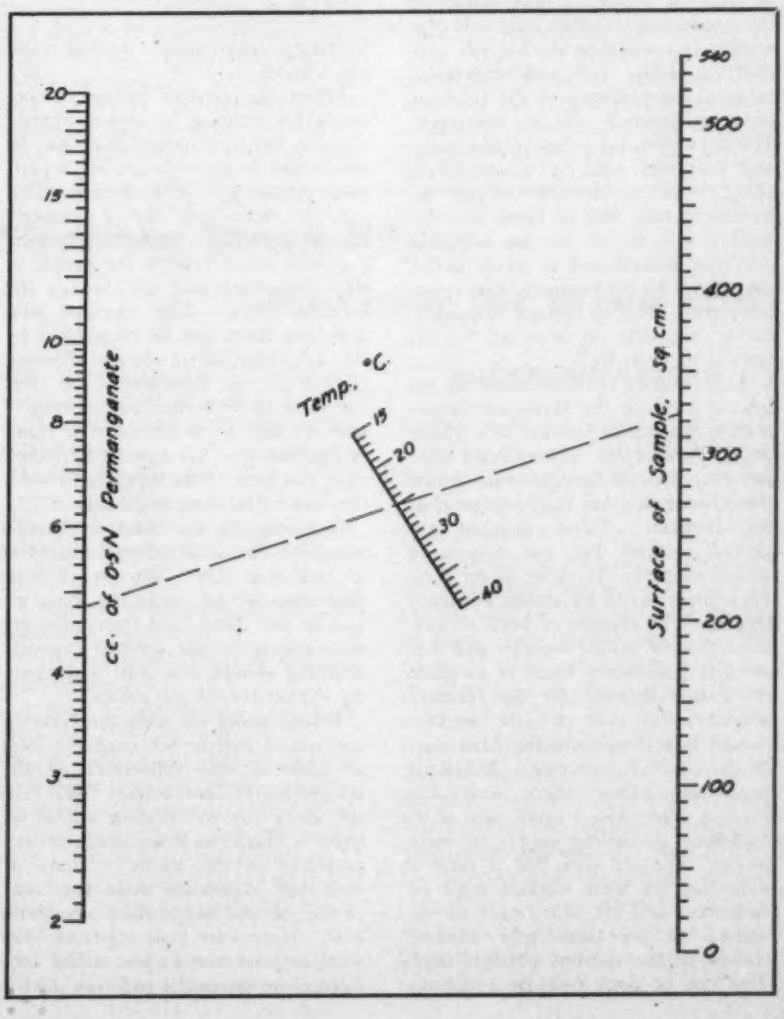
Surface Nomograph for Pulp

D. S. DAVIS
Wyandotte Chemicals Corporation

▶▶▶ THE TAPPI SUGGESTED METHOD T 226 sm-43 (1, 3) for determination of the specific external surface of pulp entails a titration with 0.5 N permanganate solution and the use of a plot of volume of permanganate against surface of the sample for temperatures between 15 and 40 C. in steps of one degree. On the chart in question ordinates are logarithmic cubic centimeters of permanganate solution, abscissae are square centimeters of pulp surface area and the isotherms are straight lines converging at zero area and 25 cc. The chart is a maze of intersecting co-ordinates and isotherms and is thus hard to read.

The use of the accompanying alignment chart, which presents the same data in a simpler form, is illustrated as follows: What is the surface of the pulp sample when 4.8 cc. of 0.5 N permanganate solution are used and the temperature is 25 C.? Connect 4.8 on the permanganate scale with 25 on the temperature scale and produce the line to the surface scale where the area is read as 325 square centimeters.

The chart was constructed by line co-ordinate methods described previously (2).



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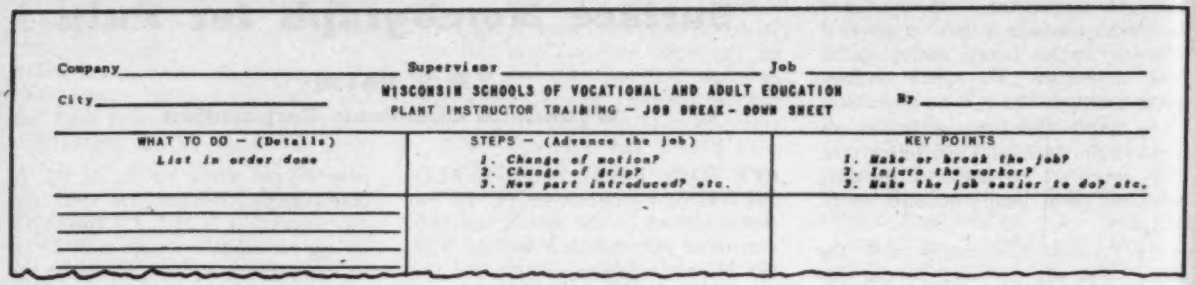

Company _____ Supervisor _____ Job _____

City _____ WISCONSIN SCHOOLS OF VOCATIONAL AND ADULT EDUCATION By _____

PLANT INSTRUCTOR TRAINING — JOB BREAK-DOWN SHEET

WHAT TO DO — (Details) *List in order done*	STEPS — (Advance the job) 1. Change of motion? 2. Change of grip? 3. New part introduced? etc.	KEY POINTS 1. Make or break the job? 2. Injure the worker? 3. Make the job easier to do? etc.

EMPLOYEE TRAINING

in the pulp and paper industry

CHARLES A. PAGNUCCO
Wisconsin Schools of Vocational and Adult Education

▶▶▶ IT IS AN ESTABLISHED FACT that instruction in any plant or mill has a definite relationship to the production in that mill. If the worker is trained to do his job correctly, quickly, and conscientiously, many of the problems of the foreman or superintendent will be overcome. The maximum use of men, materials, and machines will be accomplished along with a definite pickup in worker morale. We all know that the worker who can do his job well has a higher morale and is likely to be more loyal to the company for whom he works. This is a very important factor not only in wartime but in normal times as well.

This training must be done on the job, as most of the skills and information can not be learned in a school or from textbooks. The training must be done by the people who know more about that job than anyone else, the foremen. These foremen are skilled workers but not necessarily skilled trainers. In order to get their department up to its fullest efficiency they must be masters of both occupations, that of skilled workers and that of skilled trainers. There is no place in modern industry for the foreman who believes that all new workers should learn their jobs the hard way, as they did in the past. Industrial production today cannot wait that long or spare even a small part of its constantly dwindling supply of manpower. The old idea that it takes a long time to train workers must be forgotten, and all effort must be exercised to get these new workers trained in the shortest possible time. This can be done only by a definite training program using a definite training schedule.

When the foreman realizes the necessity for training, he also recognizes that he has a responsibility that he must meet in order to get his department operating to peak efficiency. This can be done only by a properly trained work force. Results in any department come through the people in that department and not through the foreman alone. The foreman who does not train can be recognized by the fact that he is always shooting trouble in his department; he does not seem to have time for training—will say that he is too busy to train. A foreman who has a properly-trained crew has time to do supervision work that cannot be done ordinarily.

Training, to be effective, should recognize the abilities and capacities of each individual. We are all happier when we are doing the thing we like to do. Then, and then only, are we working to our greatest capacity. Training should also start to prepare the worker for the job ahead.

Before going on with the training methods, I believe we ought to look at some of the difficulties of the learner or the new worker. We cannot do a job of training unless we have a deep understanding of the problems of the learner. Think of your own experience when you came on the job and had to learn something new. Here were your reactions: you were nervous, timid; you lacked confidence in yourself; and you had a feeling of inferiority. Now if you felt that way, what makes you think that this new worker doesn't feel that way? These feelings very often manifest themselves in several ways with the worker. Sometimes he may appear to be cocky or have a know-it-all attitude. This may be purely a defense that he has built up to hide his deep sense of inferiority, and believes that an outward appearance of confidence will give the idea that he is a good worker. We can help this person by getting his confidence and putting him at ease, because then we can break through this emotional upset and get him ready to receive our instruction. Other things that may affect the learner may be, fear of the hazards of the job, outside distractions, family troubles, awkwardness, physical handicaps, and many other factors that make it difficult for the worker to learn. As a skilled trainer we should recognize these difficulties, and we should make an effort to overcome them for the worker. This new man wants to make good, and we should give him all the necessary help to enable him to come through. If you show an interest in training him, he will have a fine feeling of respect for the foreman. If no effort is made to train him properly, he will have the feeling that no one cares whether he can do the job well or not. When he is blamed, finally, for not doing his job properly, he will feel that he is being blamed for something that wasn't made clear to him. His re-

action will be one of frustration, and his efficiency will drop along with his morale. It then becomes a personnel problem.

If the foreman has a plan of instruction for each job in which he must train, this will not happen.

This brings us to the point of a proper training procedure. There are several methods of instruction being used successfully at the present time, and all of these methods are good because they are definite plans. A plan that we in Wisconsin have and are using at the present time seems to be the answer to this problem of training new workers.

The first step in the job of instruction is to break down the job into small teaching units. (See Breakdown Sheet.) To do this, the foreman should analyze the job thoroughly, first listing all the details of the job as they are done on the job. From these details he must pick out the important steps of the job. Steps may be defined as anything that happens to advance the job. These should be major steps probably involving a number of the original details.

After the main steps have been determined, these questions should be asked of each of the steps:

1) Is there anything there that will make or break the job?

2) Is there anything there that may injure the worker?

3) Is there anything that will make the job easier to do?

The answers to these questions will establish the "Key Points" for each of the steps.

The steps represent the "What to do" parts of the job while the "Key Points" represent the "What must be known" to do the step. The "Key Points" may include any special information, knacks, timing, feel, or tricky points necessary to do the job.

Long jobs should be broken up into easily taught units which can be put over in fifteen or twenty minutes. This is most important because the average person cannot retain long drawn-out explanations of a particular job—he just cannot remember.

The matter of mental fatigue must be considered in all job instruction. Each small job should be nailed down in his mind before proceeding with the next.

After each starting job has been broken down, it is filed in a notebook for the foreman, to be used when a new man is to be instructed on the particular job.

Before the instruction starts, the man must be put at ease so that he will be ready emotionally to receive the instruction. This can be done best by a friendly attitude on the part of the foreman. The new worker must be sold on the importance of the job and its relationship to work in the department and mill. It would be well to find out what the man already knows about the job or similar jobs. This will give the instructor a basis on which to work as to the depth of the instruction. The man must be placed in the correct position so he can see the job from the proper angle. All the necessary tools and equipment should be ready and in place, just as the worker will be expected to keep it.

The job is demonstrated and explained to the new man and all key points are stressed several times. The foreman should follow the breakdown sheet closely so as not to miss or overlook any point. Following the first demonstration the foreman asks the new man to repeat the telling as the foreman does the job again, correcting the worker as he "tells."

The next step is to have the worker do the job while the foreman helps him over the rough spots by leading him along with a few helpful suggestions, making certain that the key points are stressed. If the job has gone along well, the foreman has the worker do the job again and tell all about it as he does it. This procedure will set the job and key points in the worker's mind. This step is repeated, if necessary, and is continued until the foreman is sure that the worker knows the job.

The job of instruction completed, the worker should be told who he can see or go to for help should he need any; he is given an idea of the size of the job; accuracy is stressed with speed coming later. The foreman should indicate that he will be back as soon as possible to see how the man is getting along, and makes it a point to do so. Follow-up is important.

During the instruction as the worker is doing the job for the second time, the foreman should bring out key points by well directed questions. These questions should be asked in such a manner that they cannot be answered by yes or no. To do this, questions starting with why, what, where, when, who, and how should be used. This type of question will make the worker think, thereby nailing down the correct thoughts in his own mind.

Foremen can do much to build a good department by proper instruction. This will prevent many personnel and production problems. The efficiency and morale of a department is usually a reflection of how well the foreman does this part of his job.

Shutting Down Paper Machine for Week End

ARCHIE McCAFFERY

▶▶▶ SOME OF THE THINGS that a machine tender should do in shutting down a paper machine for the week end are:

1. Shut off the stuff.

2. Shower the wire with fresh water to free it of stock that otherwise might harden in the meshes.

3. Stop the wire.

4. Squirt off the slices, deckles and fourdrinier frame.

5. Jog the wire a few feet and then squirt off again.

6. Run the wire around a couple of times.

7. If running a double couch, take the weights from the levers; otherwise the jacket will have a flat streak across its face and which will not couch when machine is started again.

8. Squirt out the dandy roll and leave it in its brackets or on the dandy board.

9. If the machine is to be down for a period of three or four days and the suction boxes and covers are of wood, close the valves in the vacuum pipes and fill the boxes with water to prevent the covers from checking and the boxes from drying out.

10. Wash the felts, either by roping or by running with water on them if suction rolls are used. On some grades of paper, even though machines are equipped with suction rolls, it is necessary to rope the felts to keep them soft and so that they will remove water. Often a machine is shut down and the washing of the felts left until the next start-up. This practice may be all right if the machine is not to be down more than one day. Best results are obtained when the felts are washed before they set and dry out. If felts are not to be washed, there is no need of putting water on them nor of slacking them up. Leave them as they are.

11. After the felts are washed, straighten them out and stop the press section.

12. Raise the top press rolls off the bottom rolls—an eight of an inch is sufficient. (If bottom rolls are rubber covered and top rolls are not raised, the top rolls will flatten the bottom rolls at line of contact. Such rolls, when machine is put into operation, will cause the weights and levers to jump at each revolution.)

13. If top press rolls are of wood, cover them with sheet pulp or with a wet felt and then wet the covering with a hose. (Failure to cover wooden rolls will cause them to check.)

14. Stop the dryers, leaving felt seams where they can be inspected.

15. If running colors or wax on the calenders, shut off the boxes and save-alls and wash them out with fresh water. If running water finish, shut off the water, and empty the save-alls. In either case, move the wipers away from the surface of the rolls and treat the rolls with a dose of kerosene, letting the stack run until the surface of the rolls is dry. This procedure prevents the rolls from rusting.

16. Stop the calenders, shutting off steam showers, steam supply to bored rolls, water boxes, and cold water dampeners.

17. Close the water valve in the line to the last dryer, and shut off the steam supply to the felt dryers.

18. Shut off power to the machine.

Industrial Relations in the Postwar Period*

▶▶▶ POSTWAR PROBLEMS related to personnel and industrial relations may well be among the first with which business management must deal. Early consideration of these matters, even while the war emergency is still in effect, may serve to minimize their seriousness. The problems in this field are many and varied.

Perhaps of primary importance is the company's responsibility to its returning service men and women. There is a need for some practical formula or criteria to determine who should be re-employed, in what capacity, and on what status as regards seniority, benefits, etc. In anticipation of this problem, one company has adopted a plan under which $200,000 is to be set aside to re-employ returning soldiers for at least a year even though there is no need for them at the time. As an approach to this problem, it has been suggested that each company make an analysis of its situation along the following lines (broken down in all cases between male and female):

1) Number of employees before the war,

2) Number of employees now or at wartime peak,

3) Number of former employees in the armed forces,

4) If current employment is higher than the prewar level, the sources from which additional employees come,

5) Number of employees likely to leave the employ willingly or voluntarily after victory,

6) Estimated number it will be possible to employ (a) immediately after the war; (b) at the postwar level of activity,

7) Period required to attain the postwar level of activity.

There is the problem of the company's responsibility to its newly employed wartime employees. Many of these the company will want to retain. Some companies have already made a careful analysis of their organizations to make such selections.

Where layoffs are necessary, the question of severance pay or unemployment benefits will come up for consideration. Reserves for this purpose have been established in some cases, and several states have already provided for special "war-risk" contributions to unemployment compensation funds by employers with war-expanded pay rolls. Also some plan for the orderly denoting or downgrading of employees who have advanced during the war and will be replaced by returning service men may be indicated.

Related to the return and replacement of workers is the fundamental question of the company's future policy regarding such groups of employees as women workers, over-age employees, and handicapped or crippled employees.

The extent and difficulty of the training problem will vary widely, depending on the extent of conversion to war work and the complexity of the operations involved. Even in nonconverted industries, however, it is probable that employees returning from military service will require, at least, a brief refresher course to sharpen old skills. There will be a real problem in retraining, rehabilitating, and reassigning crippled and handicapped employees returning from military service. Also some means must be developed for utilizing new skills discovered or developed by employees in the armed services or as a result of wartime employment. One company plans a special interview of all returning service men to ascertain such facts.

The general subject of compensation has many postwar aspects. The probable trend of wage and salary rates is a basic consideration. Even though rates should not be lower, the actual pay envelope "take-away" will probably be less because of shorter hours and less overtime. This may be a potential cause of discontent. The place of financial incentive plans or employee profit-sharing plans in the postwar picture will probably receive attention, as well as the practicability of some form of guaranteed annual wage as a means of meeting the present emphasis on security and stability of income.

The subject of union attitudes and relationships opens a wide range of questions. Related somewhat are the postwar developments with respect to various employee services and benefit programs. Will they tend to continue, expand, or contract?

The development of a practical basis of co-operation between employer and employee is, perhaps, the underlying problem in this whole field. Some of the techniques and devices occasioned by wartime needs may have postwar applications. Revitalized suggestion systems have been prolific sources of employee ideas and suggestions, many of which have had exceptional value. Ideas helpful in meeting postwar conditions should be similarly encouraged.

Some executives believe that the techniques for informing employees more fully regarding the company and its operations and for taking them into the confidence of the management—techniques developed largely for the stimulation of wartime morale—will have major importance in connection with postwar relationships. Test checks have indicated that employees are interested beyond all else in what will happen to their jobs after V day. For this reason some companies are taking steps to keep their employees informed on the progress of their postwar planning program.

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*From *An Introduction to Postwar Planning*, Policyholders Service Bureau, Metropolitan Life Insurance Company.

PAPER SKETCHES

AS EARLY AS ELIZABETHAN TIMES, TISSUE PAPER WAS PLACED BETWEEN LAYERS OF GOLD AND SILVER CLOTH TO PREVENT TARNISHING.

NEWSPRINT ACCOUNTED FOR NEARLY 77% OF A TOTAL PRODUCTION OF 4,241,767 TONS OF VARIOUS KINDS OF PAPER MADE IN THE DOMINION OF CANADA DURING 1942.

IN THE 1480'S, THE RIBOLI PRESS OF ITALY PAID 6 LIRE, 8 SOLDI (ABOUT $5.80) FOR A REAM OF HIGHEST QUALITY PAPER WITH SHEET SIZE OF PROBABLY 20 X 25 INCHES.

PAPER WAS UNPOPULAR WITH THE COPYISTS OF THE 13th CENTURY BECAUSE IT DID NOT PERMIT THEM TO PROPERLY DISPLAY PENMANSHIP AND ILLUMINATION.

ALLIED

KELLOGG DIV. OF AMSCO BUYS LOS ANGELES PLANT

Acquisition of the Crown Spray Gun Manufacturing Company of Los Angeles, California, by the Kellogg Division of the American Brake Shoe Company was effected last month.

In the new setup, H. O. Winkler, president of the Los Angeles company, becomes vice president of the Kellogg Division in charge of the Crown operation. It is stated that manufacture of the firm's spray gun equipment will continue at the Los Angeles plant under Mr. Winkler's supervision.

The Crown plant, which has been in operation since 1913, manufactures a broad range of spray guns and paint spray equipment, including industrial spray guns, booths, exhaust fans and paint containers. This group compliments the widely known Kellogg line of air compressors and will be distributed in the future as the Kellogg-Crown line. The purchase of this plant bring to 59 the number of factories operated by the American Brake Shoe organization located throughout the United States and Canada.

◆

▶▶▶ A NEW NAME has been given to The Gerrard Company, Inc., Chicago. This company, which has manufactured Gerrard Steel Strapping machines for 25 years, is now known as Gerrard Steel Strapping Company. The company states this was done to better identify the organization with its product.

◆

FLUORESCENT GLASS STANDARDS DEVELOPED BY BAUSCH & LOMB

The substitution of fluorescent glass standards to replace chemical solutions used for the calibration of fluorometric instruments has been proposed by the Scientific Bureau of the Bausch & Lomb Optical Company, Rochester, New York, which has studied and selected several types of optical and ophthalmic glass which supply reliable reproducible values.

The company has developed particular types of glass which are suitable for standards in the fluorometric determination of vitamin B_1 and vitamin B_2. Made in the form of blocks, these glass standards will replace the liquid filter holders normally used for standard solutions.

Technicians involved in this study say that the liquid solutions are tedious to prepare, as the solutions must be accurately weighed and diluted by means of very precise pipets, burettes, and measuring flasks. Furthermore, they are difficult to maintain in standard form because of their tendency to fade or decompose under the influence of light. Some of the solutions, such as quinine sulphate, are now difficult to obtain.

◆

STEIN, HALL CHEMISTS HOLD TECH. CONFERENCE

Stein, Hall & Company, Inc., New York City, recently held a chemists' conference at its main offices. About forty chemists from the companies laboratories throughout the country participated in the discussions during the conference.

The research and development work done in textiles, paper, food and adhesives during the past year was reviewed, and plans were laid for the projects to be worked on during the coming year, particularly looking toward postwar planning.

The sessions were under the direction of Dr. Alexander Frieden, technical director of the company.

◆

CALCO BUYS A DIVISION FROM INTERCHEM'L CORP.

The purchase of United Color and Pigment Company Division from Interchemical Corporation was announced January 4, by Calco Chemical Division of the American Cyanamid Company.

The newly acquired Division is located in Newark, New Jersey, and, together with manufacturing facilities, covers 8 acres. It has been a major factor in the production of organic and inorganic chemical colors and employs some 500 people.

Calco feels the combined production, as well as research and technical service facilities, will make possible greater contributions to the pigment consuming industries.

The new unit will be known as United Color and Pigment Department, Calco Chemical Division, with no change of management, personnel or policies contemplated.

◆

COLOR IN THE WAR

The third edition of PAC in PRINT (Printing and Advertising Clinics, sponsored by the General Printing Ink Corporation, New York City) discusses the job color is doing in the war effort.

This booklet, entitled *Color in the War*, contains the following articles: "The War Front," by Egmont Arens, industrial designer; "The Production Front," by Faber Birren, industrial color consultant; and "Printing and Moreal," by Fred G. Rudge, president Wm. E. Rudge's Sons. Color is vitally significant at any time, but in wartime it is vividly representative of life. This fine booklet is indeed well done, with "color" used in just the right places.

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▶▶▶ INDUSTRIAL CLOTHING coated with rubber, synthetic rubber, or other synthetic materials has been added to the line offered by Industrial Products Sales Division of the B. F. Goodrich Company. Garments will be made under limitations imposed by WPB governing the amounts of natural crude rubber, reclaimed or synthetic rubber which can be utilized.

ARMY-NAVY "E" AWARDS

▶▶▶ THE ARMY AND NAVY recently made an announcement that 5,664,000 workers in 2415 plants have won "E" awards for excellence in war production since Pearl Harbor.

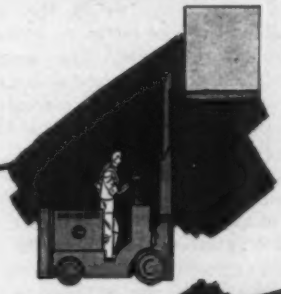
Bausch & Lomb Optical Company, Rochester, New York — The fourth white star recently was awarded this company for continued excellence. *The Labor-Management News* (WPB) states this is the highest production award so far made by the Army-Navy board and denotes two and one-half years' sustained excellence of production. [*A white star is given for each six months of continued excellence.*]

Clark Tructractor Division, Battle Creek, Michigan — This company received the Army-Navy "E" award last spring. For "continued, determined, and patriotic effort on the production front," it now has received the white star for continued excellence.

Weyerhaeuser Timber Company, Longview, Washington — A widespread program to speed production was adopted by this company. Stretching from logging camps, through railroad organizations transporting logs, all working under management committees, production was stepped up, and safety measures practiced. This teamwork won for the Longview branch of this company the coveted Army-Navy "E" award, the first "E" award to be given to a timber plant.

NEW Baker Truck Catalog GIVES THE ANSWERS TO YOUR MATERIAL HANDLING PROBLEMS

Here's real help for any plant or warehouse faced with transportation problems. The Baker Electric Truck Catalog No. 52 is more than a catalog. It is a handbook of information on material handling with power trucks, designed to facilitate selection of the proper equipment for any set of requirements. In addition to describing the 47 standard Baker Electric Trucks, it covers many special models designed for unusual handling operations.



Actual case histories featured throughout the book show Baker Trucks of all types speeding production, saving time and money and conserving man-power in a wide variety of installations. You are almost sure to find problems comparable to those in your plant, and you can profit from the experience of others in solving them.

Plant and production managers, traffic managers, superintendents, purchasing agents and any others concerned with material handling will find this book a valuable source of information. Write for your copy of The Baker Electric Truck Catalog No. 52 today.

BAKER INDUSTRIAL TRUCK DIVISION

2169 WEST 25th ST. *of the Baker Raulang Company* CLEVELAND, OHIO

In Canada—Railway and Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

ASSOCIATIONS

POSTWAR ADVANCES FORECAST AT 19TH CHEM. EXPOSITION

Spectacular advances in industrial chemistry were forecast at the nineteenth Exposition of Chemical Industries held in Madison Square Gardens, New York, from December 6-11, inclusive.

U. S. Army occupation of Grand Central Palace, the usual scene of chemical expositions, resulted in the selection of Madison Square Garden as the most accessible and best equipped location available.

The smaller exhibit hall necessitated drastic cuts in the number and size of the booths. However, exhibitors willingly co-operated, designing their presentations to fit the space available. In some instances, unwieldy machinery ordinarily used was replaced by photomurals and flow-sheets, and miniature models demonstrated the operation of apparatus that could not be shown full scale.

Occupation of plants by wartime personnel made difficult the preparation of much of the material used, and in one instance a scale model of a weight-controlled feed mechanism had been the spare-time work of a company engineer in his home workshop.

Exhibitors of industrial chemicals, processing materials and production equipment were revealed as making definite plans for the postwar period, even though presently engaged in war work. The exposition, therefore, was of definite value to visitors in that it offered an opportunity to gather and check information on important projected undertakings.

Of particular interest to paper mill visitors was an exhibit by a leading chemical company. It highlighted wartime research developments in cellulose products derived from linters, and also in terpene and rosin derivatives extracted from southern pine. Raw materials on display included Thanite, a terpene insecticide base used in household and agricultural fly sprays; new synthetic resins developed for protective coatings; plastic based on cellulose acetate and ethyl cellulose; chlorinated paraffin, used in flameproofing tents and tarpaulins, and rosin chemicals used in synthetic rubber compounding.

The construction features of a new waterproof paper bag which is being used successfully for the transportation of food and chemicals overseas, was the basis of another intriguing exhibit. The essence of this new development is the achievement of waterproofing treatment for paper, which gives it an exceptionally high set strength.

Two displays were included in the American Chemical Society's exhibit, which featured the models of two different types of cracking operations used in the manufacture of aviation gasoline and synthetic rubber. The entire field of synthetic materials engrossed the attention of those present.

Attendance throughout the exposition was highly gratifying, and included chemists, engineers and executives from many industries. Army and Navy personnel, including representatives from many specialist branches, made up a substantial contingent among the visitors.

The exposition is under the direction and management of International Exposition Company, which has managed this exposition since 1915. Charles F. Roth is president and the original organizer of the exposition. The company's permanent offices are in Grand Central Palace, New York.

NAM CONSIDERS INDUSTRY'S PLAN FOR "A BETTER AMERICA"

▶▶▶ AT THE SECOND WAR CONGRESS of American industry at the Waldorf-Astoria Hotel, New York City, top leaders of industrial management and labor met together to consider problems to be encountered in the postwar period.

The War Congress, which marked the 48th annual convention of the National Association of Manufacturers, was held December 8-10, 1943, and was dedicated to production for Victory and for postwar jobs.

The theme of the Congress was set by a series of three addresses dealing with a program for a "Better America." A few salient points from these addresses are quoted here:

"A Better America Through Freedom of Enterprise," by Frederick C. Crawford (president, Thompson Products, Inc.), president of NAM for 1943.

"All Americans long for a better America. . . . As never before, the people need leadership—strong leadership, courageous, honest, bold and sincere. . . . This leadership requires a very definite program; it must include a clear, defined goal for all Americans. . . . It must show them how to put this plan into effect. . . . Industry has a program; it is a program for a better America. . . . Five objectives as the foundation for the "Better America Program" are:

"1) The highest attainable standard of living.

"2) The fullest degree of economic security.

"3) The maximum opportunity for productive and remunerative employment.

"4) The most impartial economic justice.

"5) The greatest degree of personal freedom."

"A Postwar Program for Industry," by Walter B. Weisenburger, executive vice president of the NAM.

"It is a program—action, not just planning!—a simple pattern setting forth the rules of the game and a national attitude within the framework of which 137 million people can revive the quaint old American custom of planning and working for themselves. . . . Though not an enemy remain alive, there will be no Victory for us if the War ends with the American way of life a casualty. . . . We want the errors of the past corrected, but we want, as well, the victories of the past carried on to still greater results. . . . We can't make private enterprise better by throwing it out the window. Nor can a better America be achieved in a hybrid economy—half private, half collectivist."

"Management's Job," by H. W. Prentis, Jr., president Armstrong Cork Company.

"Management's job is, first, to devise a program. That has been done. That program must now be publicized to the American people. . . . To sell it effectively, management must understand the principles of the American Republic; apply the political and ethical philosophy on which it is based to the conduct of the every-day affairs of business; to be articulate in the interpretation of those principles to the public; test every governmental proposal against those basic concepts; support every constructive move, whether it springs from management, labor, agriculture or Government, that will make for a better and more productive America."

Since labor and management must get together to consider problems that concern the common welfare, the special panel "Jobs in Peacetime," held on the opening day of the Congress was significantly a cornerstone of Industry's plan. The Association's president, F. C. Crawford; Wm. Green,

To TITANOX or
not to TITANOX
is decidedly
NOT the question!
The question is, will you produce light weight stocks of sufficient opacity to satisfy your consumers' requirements?
If the answer is "yes", you naturally will use TITANOX pigments to obtain the unexcelled opacity which they contribute with low pigmentation.
Today more than ever, the benefits of TITANOX in paper manufacturing stand out. So small an amount of pigment is required to produce desired opacity that the strength of the paper is not impaired, a splendid writing or printing surface is obtained, and the whiteness and brightness of the paper are permanent, because TITANOX pigments never turn yellow.
May our Paper Service Department help you with your "opacity" problems?
TITANIUM PIGMENT CORPORATION
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TITANOX
REG. U.S. PAT. OFF.
TITANOX
TRADE MARK

Save it with ARMSTRONG TRAPS

STEAM saving is of vital importance in the present emergency. So is efficient heat transfer in paper machine dryers, digesters, and other steam equipment. Check your steam distribution to see where Armstrong Traps can be used to advantage in eliminating both air and condensate without steam loss.

38.5% Fuel Saving

Of reports turned in over the past 13 years dealing with fuel savings secured by Armstrong trapping, those that give figures show an average saving of 38.5%.

Thousands in Use

Armstrong Traps are favorite in paper industries because of their dependability, efficiency and long life. The Armstrong free-floating, snap action valve is immune to ordinary trap troubles.

WRITE FOR LITERATURE
OR ASK YOUR
ARMSTRONG REPRESENTATIVE

Armstrong Machine Works
814 Hoffman Street
Three Rivers, Mich.

ARMSTRONG STEAM TRAPS

HUMIDIFIERS
DRYER DRAINAGE SYSTEMS
GRADUATED TEMPERATURE CONTROLS

president of the AFL; Phillip Murray, president of the CIO; Paul Hoffman, chairman of the Committee on Economic Development; and Eric Johnston, president of the U. S. Chamber of Commerce, constituted the five-man discussion group participating in the panel.

The new president of the National Association of Manufacturers for 1944 is Robert M. Gaylord, president Ingersoll Milling Machine Company, Rockford, Illinois.

Considered the most comprehensive and complete survey of war production available is the NAM's booklet, *Production for Victory, 1943,* which was released simultaneously with the Congress. This compilation rounds out the two-year war production report of American industry. The 63-page survey is illustrated by 21 charts.

◆

AMERICAN STANDARDS ASS'N MARKS 25 YRS.

Twenty-five years of service to industry and the Government in the field of standards was celebrated by the American Standards Association at a noon meeting held in the Hotel Roosevelt, New York, December 10.

Announcement was made that the board of directors of the Association had authorized participation in an Allied Nations Standards body. Informal discussions relating to the organization of such a body have taken place recently between the British Standards Institution, the Canadian Engineering Standards Association, the American Standards Association, and the key governmental agencies in the three countries.

The function of the organization is to "spark plug" co-operation between the allied belligerent countries in standardization matters, as an aid to production and use. Its object is to secure the maximum possible co-ordination of standards necessary for the war effort and the immediate post-war period. Officers for a skeleton staff will be provided in London, and in either New York or Washington.

The meeting was attended by former officers of the Association, representatives from trade and technical groups and government departments.

Clifford E. Mack, Director of Procurement, United States Treasury Department, who is also in charge of Government Lend-lease purchasing, was guest speaker. He emphasized the use of standards as a medium for Government cost cutting, and in assisting the United States to deliver to our allies the products necessary for the successful conduct of the War.

The following officers for the coming year were announced: president, Henry B. Bryans, executive vice president of the Philadelphia Electric Company; vice president, George S. Case, chairman of the board, The Lamson and Sessions Company, Cleveland.

◆

A. J. PAGEL NOW PRES. AMERICAN WOOD PULP IMPORTERS ASS'N

In an interview following his election as president of the American Wood Pulp Importers Association, A. J. Pagel predicted early resumption of imports from Sweden. Stocks are now being accumulated in that country in the event of a return of normal business with this country in the spring. This, according to Mr. Pagel, would result in decreased exports from this country, in which case Scandinavia would be able to recover markets lost during wartime. He believed Sweden would sell to other world markets at higher prices, but that United States customers would benefit from ceiling prices.

Other officers elected at the Association's annual meeting are: Rolf Westad, vice president; B. Lindell, treasurer; and A. Blattmann, secretary.

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CONVENTIONS AND COMING EVENTS

Jan. 22—Joint meeting of Connecticut Valley Div. of the American Pulp and Paper Mill Superintendents Association and the New England Section of TAPPI at the Roger Smith Hotel, Holyoke, Mass.

Feb. 14-17—Paper Week. Annual meeting of the American Paper and Pulp Association and paper groups, at the Waldorf-Astoria Hotel, New York City.

Feb. 14-17—Annual meeting of the Technical Association of the Pulp and Paper Industry, at the Commodore Hotel, New York City.

STATED MEETINGS

Technical Association of the Pulp and Paper Industry

Delaware Valley Section—First Friday of each month at the Engineers' Club, Philadelphia, Pa.

Kalamazoo Valley Section—First Thursday of each month, including June, at 6:30 P. M. at the Columbia Hotel, Kalamazoo, Mich.

Lakes States Section—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

New England Section—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

We trust that there is a connection between this policy and the facts that follow:

During the last decade our floor space has increased 36%. Stretcher capacity has jumped 83.69% since 1935. Our engineering department originates many devices to heighten efficiency which materialize swiftly in our machine shop. Close supervision in wire drawing and diamond die departments promote the accurate, uniform sizing of Lindsay Fourdrinier wires. Laboratory activity is growing rapidly. Sufficient expansion had taken place before the war began so that we have been able to give all our attention to production.

THE LINDSAY WIRE WEAVING COMPANY
Serving the Paper Industry Since 1903
14001-14299 ASPINWALL AVE., CLEVELAND 10, OHIO

Lindsay **WIRES**
FOR PAPER MILLS

5 YEARS EXTRA USE
for 5¢ EXTRA COST!

HARPER fastenings add years and years to the service life of products and equipment on which they are used . . . and do it at a trifling extra first cost. They insure your product against the ravages of rust and corrosion. They resist numerous acids and alkalies . . . ocean salt . . . tropic sweat. They save hours of time and labor required to replace rusted common steel bolts . . . prevent failure of vital equipment . . . keep production rolling . . . are repeatedly removable. In certain alloys they are non-magnetic and non-sparking. 4320 items in stock. Write for 4 color catalog.

The H. M. HARPER COMPANY
2647 FLETCHER ST. • CHICAGO 18, ILL.
BRANCH OFFICES: New York City, Philadelphia, Los Angeles, Houston, Cincinnati, Milwaukee. *Representatives in Principal Cities*

Brass
Bronze
Copper
Everdur
Monel
Stainless

HARPER
EVERLASTING FASTENINGS

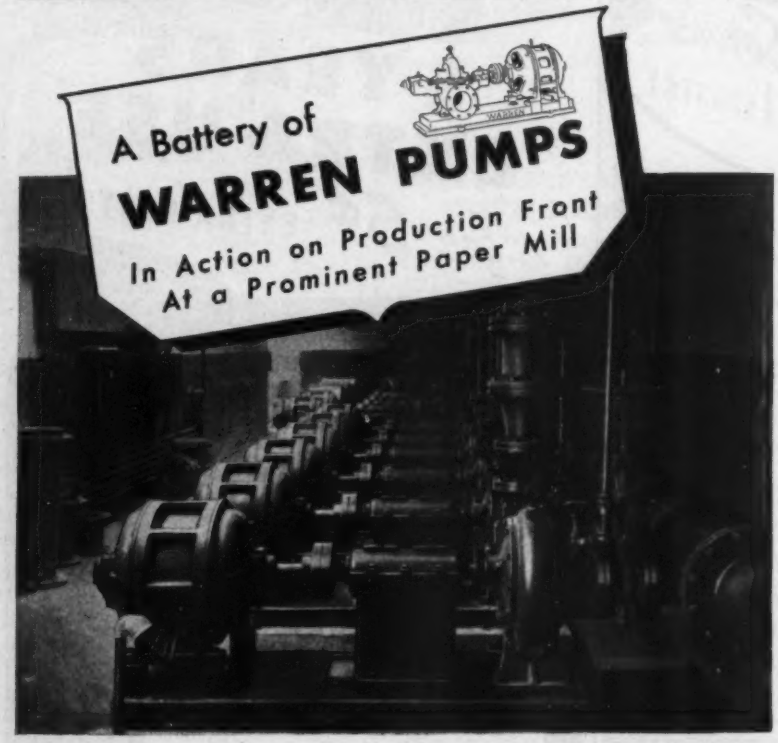
S A F E T Y

SUTHERLAND'S FLEET DRIVERS WIN HONORS FOR SAFE DRIVING

Twenty-nine fleet drivers of the Sutherland Paper Company, Kalamazoo, Michigan, were honored by their company and the National Safety Council at a banquet held the evening of December 17 at the Columbia Hotel, Kalamazoo, in recognition of their safety record—an accident-free year of driving. On this occasion the National Safety Council and the Sutherland Company presented awards to 20 drivers, some of whose safety records extend as far back as 1934. Nine drivers whose records are also accident-free were ineligible for award on that occasion, because they have been in the employe of the company for less than a 12-month period.

Commenting on the enviable record attained by his drivers, William Henry, fleet superintendent for the Sutherland Company, stated that the accident-free miles covered by the 20 drivers receiving awards totaled 1,795,000. If, to this total, is added the accident-free mileage of the 9 drivers unable to participate in this year's award, the net result would be well over 2,000,000 miles.

Safety and complimentary addresses were given by various officials and guests, and Howard Arnst, safety director for the Automobile Club of Michigan, officiated as toastmaster.



And, like the men, women and equipment in all branches of the armed forces, these pumps are giving a good account of themselves. They stick with their jobs, through thick and thin, at remarkably low operating and maintenance costs. This goes for Warren Stock Pumps, Machine Chest Pumps, Liquor Pumps and Fresh Water Pumps. In other words, for low pumping costs on all Paper Mill services, specify:

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.
WARREN, MASSACHUSETTS

SAFETY SCORES

▶▶▶ IN THE ANNUAL Paper Industry Safety Contest which began July 1, 1943, reports received for November show fifteen mills maintaining a perfect record. These mills are:

Division I—Pulp and Paper Mills

Group A—None

Group B—

United States Gypsum Co., Greenville, Miss.

St. Croix Paper Co., Woodland, Me.

Group C—

Strathmore Paper Co. (Woronoco Mill), West Springfield, Mass.

United States Gypsum Co., Lisbon Falls, Me.

Group D—

Marathon Paper Mills Co., Ashland, Wis.

Central Fibre Products Co., Vincennes, Ind.

Spaulding Fibre Co., Inc., North Rochester, N. H.

International Paper Co., Riley, Me.

Division II—Paper and Board Remanufacturing

The Flintkote Co., E. Rutherford, N. J.

Bird & Son, Inc., Chicago, Ill.

Thilmany Pulp & Paper Co. (Bag Mill), Kaukauna, Wis.

Kimberly-Clark Corp. (Atlas Mill), Appleton, Wis.

South West Box Co., Sand Springs, Okla.

Bird & Son, Inc., Shreveport, La.

Bay West Paper Co., Green Bay, Wis.

The paper industry safety contest is conducted among member mills of the Paper and Pulp Section of the National Safety Council, and runs for twelve months. The present contest covers the period July 1, 1943, to June 30, 1944.

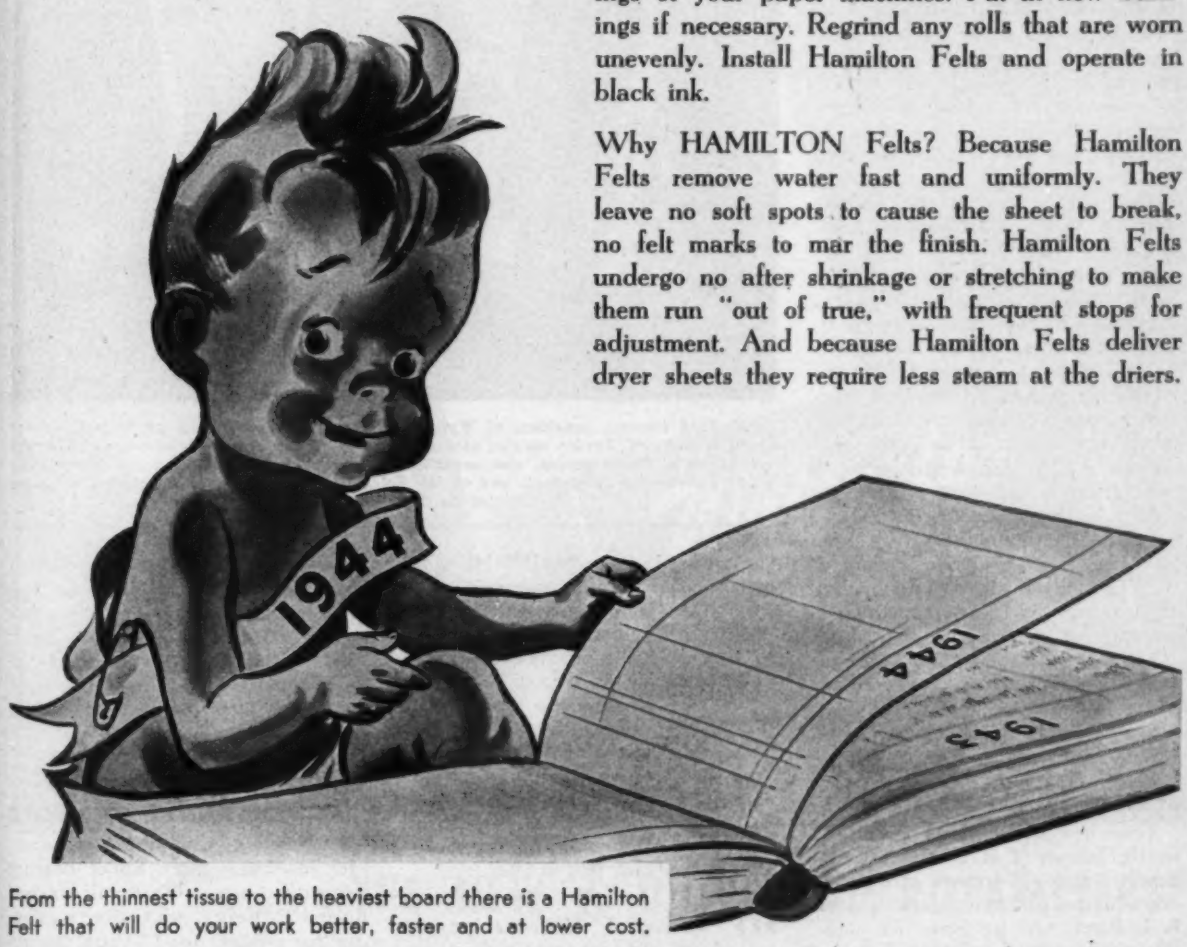
CORRECTION

It is regretted that an error was made in the scores for October published in this column last month. Seven companies were listed under Group C as having perfect scores. This should have been Group D. The two companies in Group C having perfect scores for that month were omitted. They were: Strathmore Paper Co., Woronoco, Mass., and U. S. Gypsum Co., Lisbon Falls, Me.

TURN OVER A *New Leaf*

Close the books on red figures for excessive fuel, down time, defective sheets and broke. Begin the New Year by adjusting the bearings of your paper machines. Put in new bushings if necessary. Regrind any rolls that are worn unevenly. Install Hamilton Felts and operate in black ink.

Why HAMILTON Felts? Because Hamilton Felts remove water fast and uniformly. They leave no soft spots to cause the sheet to break, no felt marks to mar the finish. Hamilton Felts undergo no after shrinkage or stretching to make them run "out of true," with frequent stops for adjustment. And because Hamilton Felts deliver dryer sheets they require less steam at the driers.



From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Miami Woolen Mills

Hamilton Felts

Established 1858

NAMES *in the* NEWS

Personals

IRVING TAYLOR RESIGNS FROM WYANDOTTE CHEM.

Effective February 1, Irving H. Taylor will relinquish his position as vice president in charge of sales for the Wyandotte Chemicals Corporation (Wyandotte, Michigan) and devote his entire efforts to the Merchants Chemical Company, of which he is president and principal stockholder. Merchants Chemical Company will continue to be one of the distributors for Wyandotte Chemicals Corporation.

Mr. Taylor has been associated with the Wyandotte Company for 32 years, and was with the Michigan Alkali Company, its predecessor. His father, E. M. Taylor, was also affiliated with the Michigan Alkali Company. The retiring vice president is well known in the heavy chemical industry and has served on governmental and export advisory committees.

At a luncheon honoring Mr. Taylor, E. M. Ford, president of Wyandotte Chemical Corporation, presented Mr. Taylor with a commemorative scroll signed by representatives and executives of the company.

Bert Cremers and C. B. Robinson will continue as vice presidents in charge of sales for the Michigan Alkali and J. B. Ford Divisions of Wyandotte Chemicals Corporation.

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LINK-BELT APPOINTMENTS

Three new appointments became effective January 1 at Link-Belt Company, Chicago. Two new vice presidents of the parent organization are: E. L. Berry, who has been vice president and general manager of the Link-Belt Ordnance Company; and Richard F. Bergmann, company chief engineer. Mr. Berry has been with the company since 1914; for many years his time has been given to matters of production and personnel. He will now be located at the company's main office. Mr. Bergmann became associated with the Link-Belt Company in 1924 through the purchase of Howe Chain Company, Muskegon, Michigan.

John E. Martin, who since Pearl Harbor has been assistant to Brigadier General G. M. Wells, War Department, Washington, D. C., has been appointed manager of the Link-Belt Ordnance Company, with headquarters at the plant. Mr. Martin began working for Link-Belt in 1927.

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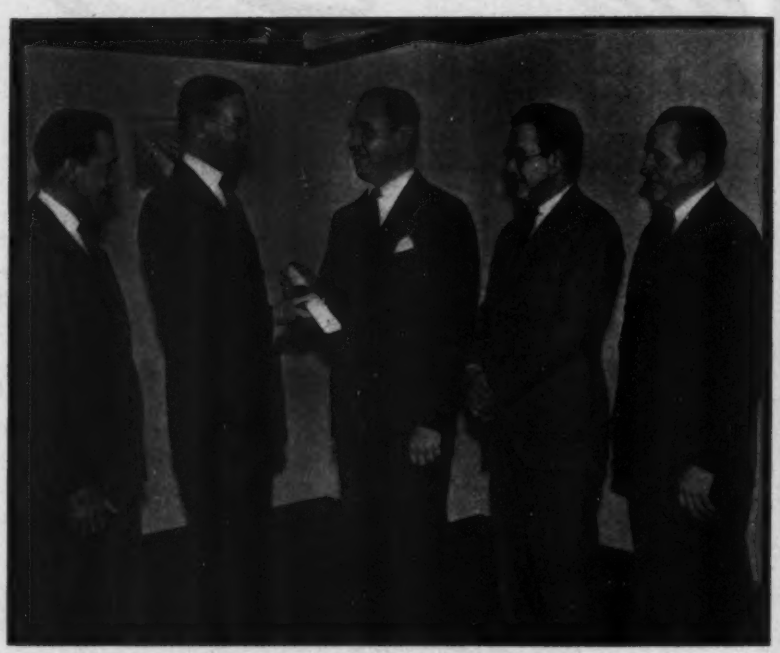
▶▶▶ *Norbert A. McKenna* has returned to the investment banking field, and is now a general partner of Reynolds and Company, members New York Stock Exchange. Mr. McKenna was the first director of the Pulp, Paper, Printing and Publishing Divisions of the War Production Board, and instituted the pulp and paper allocation planning which has become so useful today. Shortly after Pearl Harbor, he became chief of the Production and Scheduling Branch of the Motor Transport Service of the United States Army.

◆

TIMKEN ANNOUNCES PERSONNEL CHANGES

Paul Reeves, new advertising manager for The Timken Roller Bearing Company, Canton, Ohio, will succeed Roland P. Kelley, who, after occupying that position for 17 years, has resigned to enter the advertising agency field. Mr. Reeves received a degree in mechanical engineering from the Carnegie Institute of Technology and has been associated with the company since 1929.

Donald S. Klippert, Cleveland district manager of the Steel and Tube Division, has been appointed assistant general manager of sales of the Steel and Tube Division; and succeeding Mr. Klippert as incoming Cleveland district manager is Robert P. Donnell, metallurgical engineer with the company for the past 6 years.



E. M. Ford (center), president of Wyandotte Chemicals Corporation, presents Honorary Scroll to Irving H. Taylor, retiring vice president in charge of sales. Interested observers are: (L to R) Bert Cremers, vice president in charge of sales of Michigan Alkali Div.; W. F. Torrey, vice president, and C. B. Robinson, vice president in charge of sales of the J. B. Ford Division

Left to right—
J. E. Martin,
E. L. Berry,
R. F. Bergmann

. . . THE NEW UNIVERSAL ROTAMETERS*

1 New, compact, streamlined design allows for 25 piping combinations and retains rigid one-piece tube-frame construction.

2 Can be quickly installed in any pipe line at low cost. Provide accurate measurement of flow rates as low as 1/10 of maximum.

3 For measuring the flow of practically any liquid or gas, such as water, air, oil, alcohol, fuel oil, gasoline, acids, alkalis, etc.

4 Water capacities range from 19 c.c. per minute to 38 gpm and air capacities from 0.01 to 80 cfm; other liquids and gases in proportionate capacities.

* Schutte & Koerting PIONEERED the development in the United States of tapered-tube, visible-float flowmeters, designated by the name ROTAMETER.

SCHUTTE & KOERTING CO. MANUFACTURING ENGINEERS
1151 THOMPSON STREET, PHILADELPHIA 22, PA.

R. M. BUCKLEY MADE VICE PRESIDENT OF SOUNDVIEW PULP CO.

An announcement from the Soundview Pulp Company, Everett, Washington, dated January 3, states that R. M. Buckley has been appointed vice president of that company.

Since joining the company in March, 1943, Mr. Buckley has been active in

R. M. Buckley

the company's New York office. Before coming with the company, he held executive positions in the War Production Board. Previously, he was on the staff of the Kraft Pulp Division of St. Regis Paper Company in Tacoma, Washington.

Mr. Buckley is a native of Montana and a graduate of the University of Washington.

◆

RICHARD DEMPSEY MADE PRESIDENT OF STRATHMORE

The election of Richard H. Dempsey to succeed Horace Moses as president and general manager of the Rising Paper Company of Housatonic, Massachusetts, has been announced by the board of directors. Mr. Moses has been made chairman of the board.

The new president, who has two sons in service, began as an office boy 25 years ago, working for the Strathmore Paper Company at its Number One mill at Woronoco. Promotions took him through every phase of papermaking, including the research division. He spent four years at the company's Springfield plant as a laboratory technician and then became assistant superintendent of his old mill at Woronoco.

Mr. Dempsey became superintendent of the Rising Paper Company in 1930 and was later made a director and vice president in charge of production, positions he held until his election to the presidency.

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R. V. MITCHELL WILL GIVE FULL TIME TO HARRIS-SEYBOLD-POTTER

The Harris-Seybold-Potter Company, Dayton, Ohio, announces that R. V. Mitchell has discontinued his long association with the investment banking business and hereafter will devote his full time to the presidency of the Company. As president of Harris since 1922, he always has been keenly interested in the affairs of the graphic arts industry and of the various industry associations. Active in the establishment of the Lithographic Technical Foundation, Mr. Mitchell has helped guide its efforts as a vice president for many years. The company's present all-out war effort and its plans for postwar business in the graphic arts make this action particularly pleasing to all his associates, and brings to both Harris and the graphic arts the full-time services of an outstanding executive.

Mr. Mitchell is also a director of The General Printing Ink Corporation, New York; Thompson Products, Inc., of Cleveland; Cornell Dubelier Company, South Plainfield, New Jersey; The Union Metal Manufacturing Company, Canton, Ohio; Dill Manufacturing Company, Cleveland; and The Copperweld Company, Glassport, Pennsylvania. He is vice president of the Associated Industries of Cleveland, and a member of the executive committee and a trustee of Aultman Hospital of Canton.

R. V. Mitchell

DR. LACEY NOW A DIVISION CHEMIST WITH CALCO DIVISON

The Calco Chemical Division, American Cyanamid Corporation, Bound Brook, New Jersey, has appointed Dr. Harold T. Lacey division chemist in charge of lakes and intermediates for the dry color and printing ink trades. In this division

Dr. Harold T. Lacey

also are manufactured basic dyes and Alkali Blue toners.

Dr. Lacey entered Cornell, receiving his Bachelor of Science degree in 1921 and Doctor of Philosophy degree (chemistry) in 1926. He studied in Vienna, Munich and Graz, later becoming research chemist for the Grasselli Division of du Pont, Newark, New Jersey.

Associated with the Calco Chemical Company since 1932, Dr. Lacey in recent years has been identified with problems in research on Government signal work. He is a member of the American Chemical Society, the American Association for the Advancement of Science, a Fellow of the American Institute of Chemists, and a Fellow of the Mellon Institute.

◆

▸▸▸ Western sales manager of Calco Chemical Division, American Cyanamid Company, for the past two years, *Robert D. Howerton* passed away recently. After receiving his Bachelor of Science degree from Washington & Lee in 1922, Mr. Howerton identified himself with the textile dyeing and finishing industry and later became associated with the sales staff of the American Cyanamid Company. His is survived by his widow, two sons and a daughter.

Simplicity of Design Means Easier Maintenance

SERVICING IN THE LINE SAVES TIME . . . . . .

. . . and it saves the valve, too, because regular servicing not only keeps the valve in top condition and gives it longer life, but it reduces the possibility of having to make extensive repairs later. The simplicity of Lunkenheimer design makes all parts easily accessible for checking any first signs of lagging operation, and the taking of precautionary measures.

Valves are among your most vital production equipment . . . in fact, the very backbone of your production lines. That's why new valves are scarce and hard to get. That's why it's imperative to take the best of care of those you now have in service.

It's not a difficult job. Valves respond to good treatment and the little extra time required to keep them in top working order will be amply repaid in uninterrupted production hours.

Use the complete facilities of Lunkenheimer distributors.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

"QUALITY"

CINCINNATI 14, OHIO, U. S. A.

NEW YORK 13 CHICAGO 6
BOSTON 10 PHILADELPHIA 7

EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.

IT'S EASY . . . TO GET TO THE WORKING PARTS

Simply open the valve part way, unscrew union ring, and the complete assembly of working parts can be lifted from the body—for inspection, cleaning, seat and disc regrinding, or replacement of parts if necessary.

Ask for Lunkenheimer Catalog 78 and the Guide for selecting valves.

BRONZE, IRON, STEEL AND CORROSION RESISTANT ALLOY VALVES, 125 TO 2500 LB. S.P.; BOILER MOUNTINGS, LUBRICATING DEVICES, AIRCRAFT FITTINGS

OLD-TIMER MADE PRES. BRYANT 25-YR. CLUB

Christian Schrier, a maintenance mechanic at the Bryant Paper Company, Kalamazoo, Michigan, has just been made president of the company's "25-year club."

Mr. Schrier's experience in the industry dates from 1884, when he helped to install the first sprinkler system in the plant of the Gibson Paper Company, Kalamazoo (now the Monarch division of the Allied Paper Mills), remaining with them as maintenance mechanic until 1887. In that year, the Bardeen Paper Company plant was erected at Otsego, Michigan, the project being financed by a group of men, one of whom was Jacob Hoek, an uncle of Mr. Schrier. Mr. Schrier became associated with that company when the plant went into production, staying with them until 1903. He left for a brief period and returned in 1904 to affiliate with the Bryant Paper Company in Kalamazoo [also founded in 1887 by Jacob Hoek and his associates], where he has since been employed as maintenance man.

During his 40-year period with the company, Mr. Schrier has witnessed many changes. The original one-plant mill is now a three-plant organization covering nearly 140 acres, and one of the country's largest book paper mills.

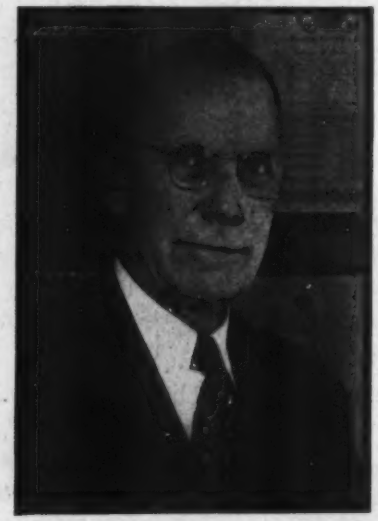
◆

▶▶▶ In addition to serving as manager of the Agency and Specialties Department, Westinghouse Electric and Manufacturing Company, East Pittsburgh, announces that *James H. Jewell* has been appointed assistant manager of Industry Departments, and that he will supervise all of this department's activities except those pertaining to application data, training, and general contract. Mr. Jewell has been associated with the company since 1920.

James H. Jewell

◆

▶▶▶ The OPA has appointed *Ira S. Reynolds* Unit Chief in charge of prices affecting the manufacture of newsprint, groundwood specialties, glassine and greaseproof papers. Mr. Reynolds has been connected with the St. Regis Paper Company, New York, for the past nine years. He was previously associated with the Claremont Paper Company, Inc., Groveton Papers Company, and for twenty years was branch manager for Nekoosa-Edwards Paper Company.



Ira S. Reynolds

◆

▶▶▶ General sales manager of The Falk Corporation, Milwaukee, Wisconsin, is the new title of *Thomas E. Scannell,* who, prior to his appointment, was sales manager for all Falk products, with the exception of those coming under the jurisdiction of the foundry division. The position of assistant sales manager in charge of foundry sales will be held by *John S. Wilkinson.* A graduate of Yale, class of 1918, Mr. Scannell saw service in World War I and has been connected with the Falk organization since 1928.

◆

▶▶▶ After an 18-month absence due to ill health, *Milton Kutz* returned to his former position of acting assistant general manager of the Electrochemicals Department of E. I. du Pont de Nemours and Company, Wilmington, Delaware, effective January 1. During the interim Mr. Kutz held a less strenuous position with the company.

NEW APPOINTMENTS AT GEN. PRINTING INK

General Printing Ink Corporation, New York, announces the following appointments: Charles R. Sherman, director of purchasing, is now general manager of its General Industrial Finishes Division.

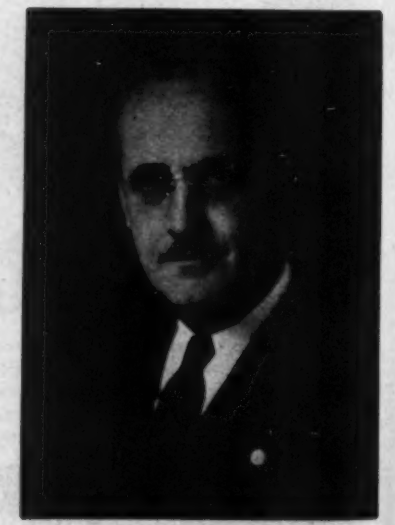
Frederick W. Clayton is the incoming purchasing agent. Affiliating with the American Printing Ink Company in 1913, Mr. Clayton was vice president when the General Printing Ink Corporation was formed, and has more recently been active in the General Industrial Finishes Division.

◆

▶▶▶ *Archie Chandler,* vice president of the American Pulley Company, is retiring from active sales management of the company. *Frank E. Brown,* assistant sales manager for the past 15 years, has been named to succeed Mr. Chandler as general sales manager. Mr. Chandler will continue as vice president, but will now return to San Francisco, his former home, from which point he will direct the company's west coast sales and service.

◆

▶▶▶ *William A. Blume,* president of American Brakebloc Division of American Brake Shoe Company, New York, has been elected a vice president of the American Brake Shoe Company. A graduate of Penn State College, class of 1915, Mr. Blume has been associated with the company since 1919, becoming vice president of the American Brakebloc in 1932 and president in 1940. His official connection with the Brakebloc Division will not be affected by his new appointment.



Wm. A. Blume

APPLETON

TWO FRIGATES, the Knoxville and Chattanooga, being fitted out in the slip at the Leathem D. Smith Shipbuilding Company, Sturgeon Bay, Wisconsin, where they were built.

Into fighting ships like these goes much of today's output by the men who built your Appleton Paper Mill Machinery. By contributing our full part to America's production for Victory we are developing new facilities and new knowledge that will aid greatly in supplying the post-war needs of the paper industry.

PAPER MILL MACHINERY

THE APPLETON MACHINE COMPANY

• APPLETON • • WISCONSIN •

Eastern Sales Representatives – CASTLE & OVERTON, Inc., 630 Fifth Avenue, New York

RALPH L. WILSON LEAVES WPB JOB— RETURNS TO TIMKEN

On January 1, Ralph L. Wilson, who has been chief of the Constructional Steels Section of the Metallurgical and Conservation Branch, Steel Division, of WPB in Washington, returned to Timken Roller Bearing Company, Canton, Ohio, as chief metallurgical engineer.

Mr. Wilson was for ten years metallurgical engineer of Timken's Steel and Tube Divisions, during which time he specialized in alloy steel tubing applications in the various process industries. He is well known for his work on the properties of metals at elevated temperatures and has written a number of articles on this subject. He is a member of several national organizations including the American Society of Mechanical Engineers.

◆

▶▶▶ *William S. Fowler* has resigned as art director and sales manager of the Hampden Glazed Paper & Card Company, Holyoke, Massachusetts, with whom he has been associated for the last 20 years. His father was the late Norman Fowler of Springfield, Massachusetts, one of four brothers who founded the company in 1881.

◆

▶▶▶ Effective January 1, the board of directors of the Pittsburgh Plate Glass Company, Pittsburgh, announced the following changes in executive personnel: *Clarence M. Brown* resigned as chairman of the board of directors, but remains active on the executive committee, the board, and as chairman of the finance committee; *Harry S. Wherrett,* vice chairman, has become chairman of the board; *Robert L. Clause,* president, is vice chairman of the board; *Harry B. Higgins,* executive vice president, is now president.

◆

▶▶▶ A new paper-mill connection has been announced by *Herman M. Grasselt,* formerly production manager of Collins Manufacturing Company, North Wilbraham, Massachusetts. Mr. Grasselt is now associated with American Tissue Mills, Holyoke, Massachusetts, in an executive capacity. He is well known as a contributor to papermaking literature.

◆

▶▶▶ Connected with the rubber industry for over 16 years, *H. E. Van Petten's* appointment as manager of the advertising division for the B. F. Goodrich Company, Akron, Ohio, has been announced by Frank T. Tucker, advertising director. Included in Mr. Van Petten's new duties will be manager of tire advertising which position was formerly held by George F. Cozzens, now in the Army.

◆

▶▶▶ *Lieutenant Thomas L. Sterling,* USNR, has been made administrative aide to Rear Admiral Charles P. Mason, commandant of the Corpus Christi, Texas, naval air training station. Prior to his enlistment in February, 1942, Lieutenant Sterling was a sales engineer at the Hercules Powder Company's, Holyoke (Massachusetts) plant, and was at one time British sales manager for Paper Makers' Corporation, Ltd., a Hercules subsidiary.

Lieutenant T. L. Sterling (Official U. S. Navy photograph)

◆

E. M. ALLEN RETIRES AS PRESIDENT OF THE MATHIESON ALKALI CO.

The retirement of E. M. Allen as president of The Mathieson Alkali Works, Inc., effective January 1, and the election of G. W. Dolan as his successor, have been announced. Mr. Allen, who became president of the company in 1919 and chairman of the board in 1938, will continue to hold office as chairman of the board.

Mr. Dolan joined the Mathieson organization in 1930 and has held various positions of responsibility since that time, having been elected executive vice president in 1941.

Necrology

GUY C. HOWARD

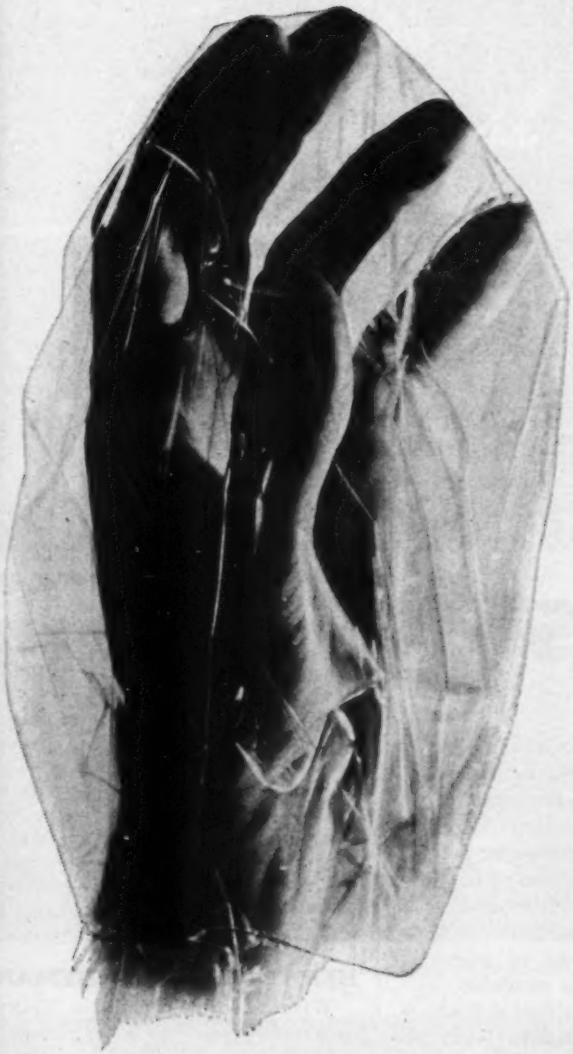
The passing of Guy C. Howard, chemical engineer for the Marathon Paper Mills Company, Rothschild, Wisconsin, was a loss to his company, as well as the paper industry. Mr. Howard was stricken while at work on December 19. He was 64 years of age.

For the past several years, the research work conducted by Mr. Howard resulted in discoveries of by-products from the utilization of waste sulphite liquor that were outstanding and of inestimable value. A number of the chemical processes developed by him have been patented. He was perhaps most widely known for his research in producing vanillin from waste sulphite liquor. The Salvo Chemical Corporation, affiliated with the Marathon Company, furnishes approximately half the vanillin consumed in this country, using the Marathon-Howard process.

Mr. Howard was born in Batavia, New York. He graduated from the University of Nebraska and did postgraduate work in chemical engineering at Columbia University. He had been consulting engineer in Seattle, Washington, and later became associated with the American Smelting and Refining Company, Tacoma, Washington. In 1927, Mr. Howard was placed in charge of research at the Marathon Paper Mills Company. He was a mem-

A TOUGH FILM-FORMER

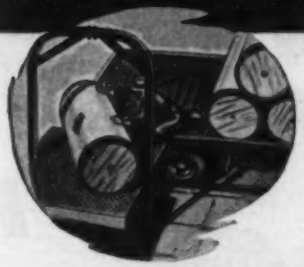
THAT'S WATER SOLUBLE!



Extraordinary film-forming ability makes Methocel a most useful material. It produces tough, flexible films that are clear, colorless and free from taste or odor. Of outstanding importance—Methocel films are soluble in water—a unique and valuable property that suggests a variety of new uses. For other jobs, resistance to water can be increased.

Methocel films or coatings are unusually stable to discoloration or attack. They are also neutral and non-toxic and are easily plasticized where extra softness is required.

METHOCEL
THE UNIFORM SIZING MATERIAL



In paper sizing and coatings, Methocel's film-forming properties are unusually effective. These properties are responsible for Methocel's ability to form a continuous barrier on the surface of the stock for retarding penetration of oils, greases, ink vehicles, paraffin and paper lacquers. The use of Methocel, therefore, promotes production, saves raw materials and lowers costs.

Application at the size press, water box, or by means of supplementary coating equipment, assures optimum results from even small quantities. Technical data available on request.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Chicago
St. Louis • Houston • San Francisco • Los Angeles • Seattle

METHOCEL

Other Dow products for the Paper Industry include: Dowicides, Ethocel, Caustic Soda and many other chemicals.

DOW
CHEMICALS INDISPENSABLE
TO INDUSTRY AND VICTORY

ber of the American Chemical Society and the American Institute of Chemical Engineers.

Surviving are the widow, a son and a daughter.

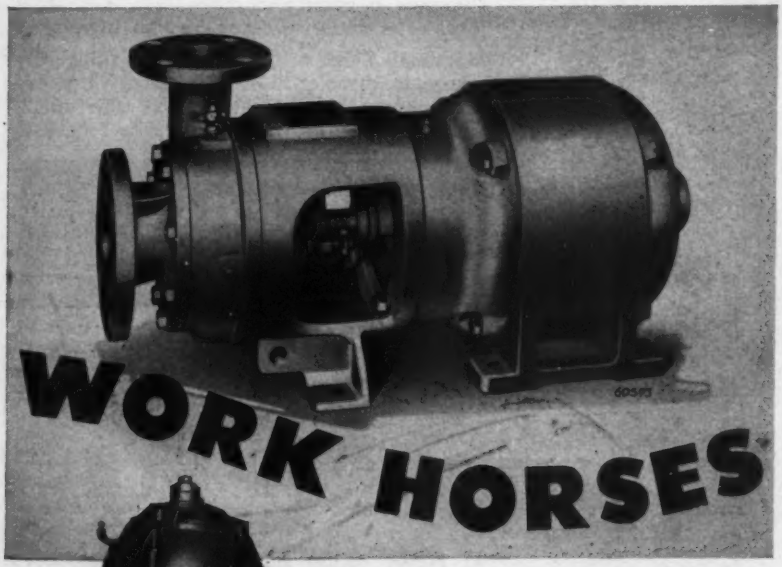
◆

CHARLES HENRY NOBLE, SR.

A resident of Kalamazoo, Michigan, for 50 years, Charles Henry Noble, Sr., passed away December 31, at the age of 62.

Mr. Noble was district manager for the A. E. Staley Manufacturing Company, Decatur, Illinois, and he was well known for his connection with several paper mills as superintendent. When he was fourteen, he started to work for the MacSimBar Paper Mills, Otsego, Michigan. Later, he went to work for the King Paper mill (Kalamazoo), working his way up to mill superintendent. He helped the late John King to build the Rex Paper Company (Kalamazoo) and served as its superintendent until 1915. He also served with paper manufacturing plants in Indiana and Illinois before becoming associated with the Staley Manufacturing Company.

The widow, two sons and two daughters survive.



Pumps for paper mill service must be real work horses — 24-hour-a-day service calls for the sturdiest of construction.

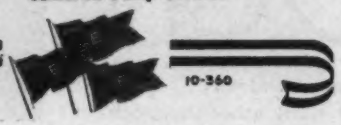
Ingersoll-Rand Cameron paper mill pumps are built for this kind of service and they have proved their ability in mills all over the continent.

Practically every type of pump used in the paper mill is available—a new vertical stock, horizontal stock pumps, white water pumps, liquor pumps, acid pumps, fresh water pumps, boiler-feeders—in fact, pumps for any liquid.

Ask the Ingersoll-Rand engineer for full details. Ingersoll-Rand Company, 11 Broadway, New York 4, N.Y.

Ingersoll-Rand

Cameron Pump Division



10-360

HAROLD R. TELFER

The chief executive of the Detroit Sulphite Pulp & Paper Company, Detroit, Michigan, passed away December 28 at the age of 47.

Harold R. Telfer had been president of the Detroit company since 1936. He was advanced to that office after he had served as vice president in charge of sales for four years. Mr. Telfer became associated with the company in 1921, one year after graduating from the University of Michigan. He served in World War I, returning to college for his degree after the war.

Surviving are the widow and three children: two daughters, and a son, Corporal Harold Robert Telfer, now in the Medical Corps at Sheppard Field, Texas.

◆

▶▶▶ *Lieutenant James Ariott,* a member of the Special Service Force, was reported among the casualties in Europe December 4. A qualified paratrooper, Lieutenant Ariott was among those who occupied Kiska last August. Before enlisting, he was employed by the Consolidated Paper Corporation, Montreal, Canada.

◆

WILLIAM C. WING

Retired paper mill owner, William C. Wing, passed away at his home in Neenah, Wisconsin, on Thanksgiving Day at the age of 67.

Mr. Wing had lived in Neenah most of his life. His start in the paper industry began in 1895 when he took a position with the Gilbert Paper Company, of Menasha. He then went into the insurance business and later founded the Hardwood Products Company of Neenah. He sold his interest in this concern and took over the operation of the Fox River Paper Company in Appleton. In 1938, this company was sold to the Fox River Paper Corporation, and Mr. Wing retired.

◆

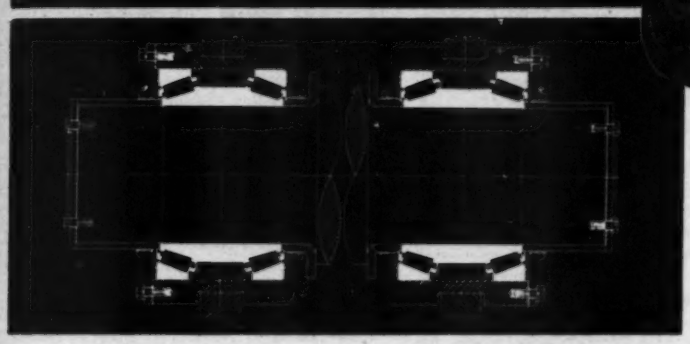
HENRY CHARLES ZIEMAN

Widely known in both the United States and Canada as a paper manufacturer, Henry Charles Zieman passed away at his home in Niagara Falls, New York, on December 18.

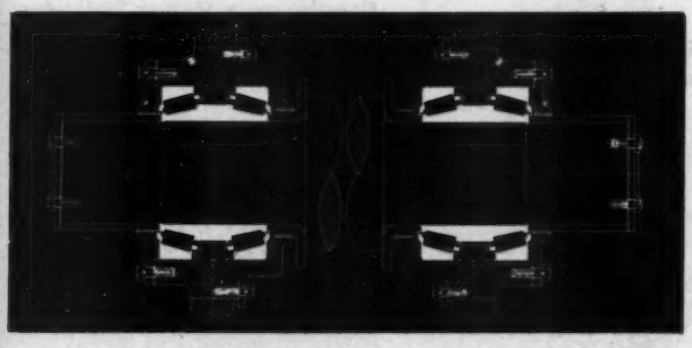
Actively associated with the industry for many years, Mr. Zieman was paper mill superintendent for the Beaverwood Fibre Company, Thorold, Ontario; Great Northern Paper Company, Millinocket, Maine; Abitibi Pulp & Paper Company, Iroquois Falls, Ontario; Spanish River Company, Sturgeon Falls, Ontario; and Great Lakes Paper Company, Fort William, Ontario.

Surviving are his widow and a son.

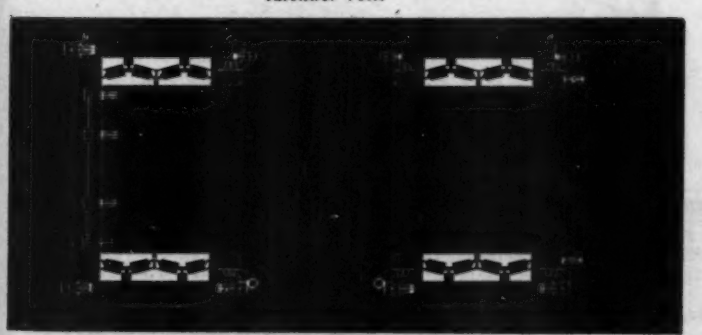
TIMKEN BEARINGS speed up Supercalender Operation – *Reduce Cost*



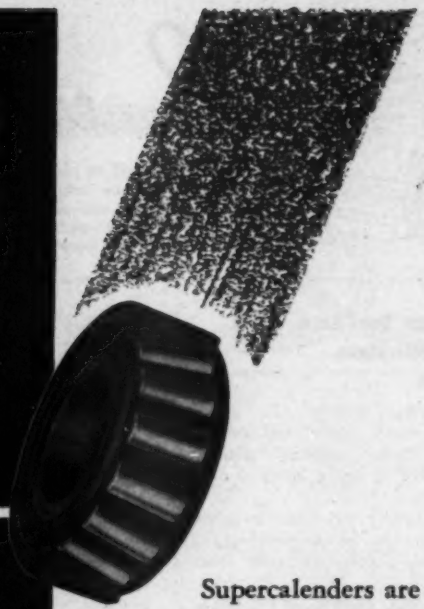
Application of Timken DI Bearings to a top calender roll.



Application of Timken DI Bearings to an intermediate calender roll.



Application of Timken 4-row Bearings to the bottom roll of a calender stack.



Supercalenders are busy these days, for to a considerable extent their product must fill the gap left by the general reduction in stock weights and the curtailment of coated papers.

A definite saving of time, improvement in finish and reduction in waste are noted when supercalender rolls are mounted on Timken Tapered Roller Bearings.

Exactness of roll setting is maintained constantly; roll pressure is uniform from end to end; less power is required; calenders can be restarted at any time without raising the weights.

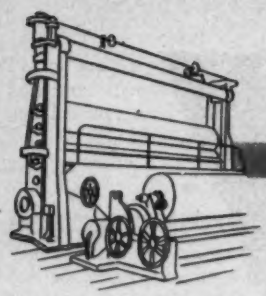
Furthermore, the full width of the paper is usable because there is no leakage of lubricant to soil the ends; this is another factor of increased production.

Plain bearing supercalenders can be changed over to Timken Bearings. Consult the machine builder or Timken engineers. The Timken Roller Bearing Company, Canton, Ohio.

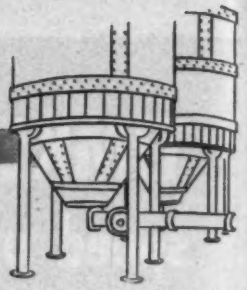
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

Instructions for Use and Care of Chlorine Containers

1. Store chlorine cylinders in places where heavy articles cannot fall on or against them. Protect chlorine cylinders against the hazard of being knocked over or falling down.

2. Do not handle cylinders roughly. Never drop cylinders or permit them to collide one with another or with other heavy objects.

3. Require some responsible employee to keep accurate count of stocks and see that empty cylinders are gathered up and returned promptly. Do not store full and empty cylinders together. Customer is held responsible for safe return or for the value of cylinder if lost or damaged. Cylinders must not be refilled with any gas or other materials nor by anyone other than..... .....[the original producer].

4. Never store chlorine containers near inflammable or hot materials. The fusible safety plugs melt at 165 Fahr. and permit escape of chlorine. The gas pressure in the cylinder rises rapidly with increasing temperature. We suggest cylinders be stored outside the factory but under cover.

5. Do not remove the outlet cap from a chlorine cylinder until ready to put it into service. Replace cap and close valve when cylinder is empty. It is best to evacuate cylinders on a scale and to close the valve as soon as the scale shows the billed weight of contents to have been used.

6. Always plug the open end of your own equipment immediately after disconnecting a chlorine container. Your equipment should be cleaned and thoroughly dried at regular intervals, and whenever the interior shows signs of foreign deposits. Remember dry chlorine does not attack ordinary metals.

7. Each cylinder of liquid chlorine is supplied with a large and small sized lead gasket. We recommend using the large size, which fits against the flange of the adaptor nipple. Small lead gaskets often squeeze shut and prevent flow of chlorine.

8. When the cylinder is in operating service for several days or more, open and close the valve once each day to prevent the stem threads from becoming set in any one position. Each valve is carefully inspected and tested before the cylinder is shipped to you.

9. If chlorine liquid is wanted the cylinder in service should stand valve end down. If chlorine gas is wanted, the service position of the cylinder should be valve end up.

10. In case of ton container gaseous chlorine is obtained from the upper valve and liquid chlorine from the lower one.

11. When emptying liquid chlorine cylinders, always have sufficient gas pressure to prevent your liquid from being drawn into the cylinder due to a vacuum. A pressure gauge located on the piping end will serve as a safeguard in this respect.

12. Fix all leaks as soon as possible. Avoid improperly connected joints. After making up a connection, test for leaks with a rag wetted with ammonia, which will show dense white fumes if gas is escaping.

13. In case of accidental breakage of a chlorine cylinder or valve, move it outside and turn the hose on the escaping gas. Cold water absorbs chlorine. Alkaline solutions, such as caustic soda, slaked lime, etc., neutralize chlorine rapidly.

14. If a cylinder is found out of order, mark cylinder defective and return it promptly. Notify distributing agent promptly stating cylinder number and nature of damage.—DIAMOND ALKALI COMPANY.

◆

Cleansing Floors with Soap and Water

1. Wear shoes or boots with non-slip soles, rubber gloves, and protective pads—if necessary to get on your knees.

2. Clean floors when traffic is lightest, preferably at night. If this is not practicable, rope off the area.

Courtesy National Safety Council

3. In large areas, flush only part of the floor; clean this, then proceed to another part.

4. If necessary to move objects, place them where they cannot become stumbling hazards. When the floor is cleaned, return them to their proper places.

5. When soap or soap powder is used, see that it is dissolved completely. Be especially careful to rinse off with clean water all soapy film that may remain after the washing process. This is particularly important on or about stairs or ramps, and on steel, tile, terrazzo, marble, and other hard surfaces. Repeated rinsing may be necessary.

6. After cleaning is completed, go over every part of the floor with dry mops and remove all water. Mops should be wrung out frequently. Dry thoroughly the space about machines, work benches, stairs and ramps.

7. On some floors difficult to dry, it may be necessary to keep barricades in place for a considerable time. Take no chances with slippery floors.

8. Remove all mops, pails and other cleaning equipment from the floor area and store them safely. *Safety Instruction Card No. 472,* NATIONAL SAFETY COUNCIL.

◆

Breaks on a Paper Machine

If anyone desires to tear a piece of cloth, paper, or other similar sheet material, it is common practice to tear the sheet from one of its edges. This procedure is followed because a tear usually can be started more readily from an edge than from any other portion of a sheet. The same logic applies to a sheet of paper on a paper machine.

If the sheet is to stick to a press roll, tear on the dryers, or snap off at the calenders, more often than not the break starts on an edge rather than further in on the sheet. This statement does not infer that the break may not have had its origin elsewhere than the edge from which the tear begins.

The cause of a break cannot always be immediately foretold. A break occurs when the stock is not right, when the speed of the machine is too fast, or when some unit or units of the machine is/are not operating properly.

If everything about a machine is functioning normally, the sheet will stay over. It is when something is wrong that the machine help is busiest.

The best machine tender, or back tender, is not always a man who knows the most about a machine. Rather he is a man who pays attention to his job and who locates sources of trouble before trouble occurs and makes the necessary adjustments to keep the machine making paper.

The back tender who permits his slitters to become dull, who takes a chance on somebody else having to put on the new

slitters, is apt to have trouble any time. The slitters may fail to cut when he is behind on reels; and then unless the machine is most modern, it will have to be shut down to change them. An incident of this kind is but one example of neglect on the part of a machine crew.

Every member of a crew has certain definite responsibilities. These individual responsibilities must be taken serously if the entire crew is not to get in trouble.

The machine crew that is alert will do less work than a crew less observant. In other words, a crew member may help himself and his associates by being vigilant. In fact, vigilance will assist in minimizing waste caused by breaks. ARCHIE MCCAFFERY.

◆

How to Make Your Rope Last Longer →

1. Don't drag rope along the ground. Carry the coil on your shoulder. Dragging rope rubs off some of its outer fibers, and the grit and sand picked up may work into the interior of the rope, weakening the fibers.

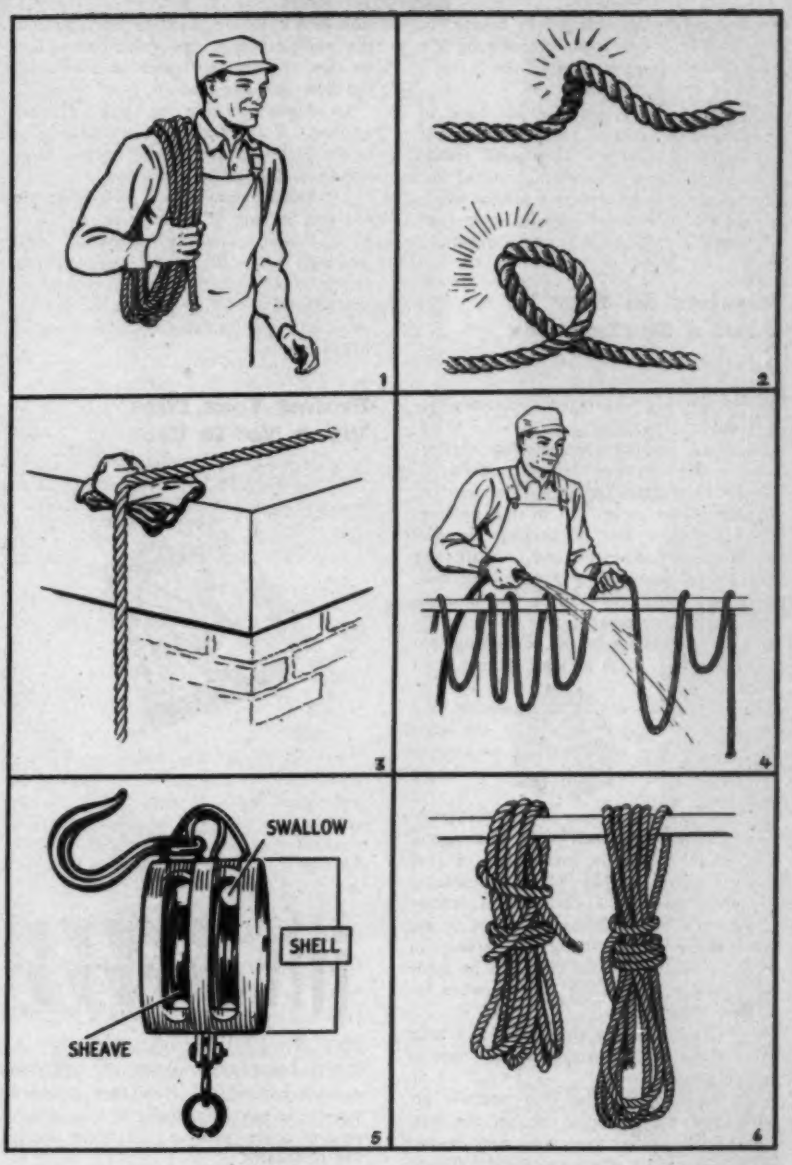
2. Keep your rope free of kinks at all times. Kinks in a rope under strain will harm the fibers at the point of the bend. Kinking is most likely to occur when a rope is wet, due to shrinkage of the rope caused by a swelling of the fibers, thus shortening the lay.

3. Avoid running rope over sharp corners where the strain may damage the fibers. In making a rope fast select, if possible, an anchorage with a smooth surface of large diameter. Place a pad of bagging or rags between the rope and any sharp edges over which the rope must pass under load.

4. Keep your rope clean. When it becomes dirty, loop it loosely on a bar and gently hose the dirt off and out. Shake the rope well, allow it to dry, and store in a dry, cool, airy place.

5. Use blocks of proper size. Surface wear of rope occurs when the sheave holes (swallows) in the block are too small to permit sufficient clearance. Rope life is prolonged by using blocks with sheaves of large diameter. Manila rope of 1-inch diameter requires a block with a shell length of 9 inches.

6. Don't store your rope by winding it up and tossing it into a corner of the shop. Small ropes should be coiled neatly and hung on a bar or beam where air circulates freely. Large ropes should be coiled and placed on gratings raised off the floor.—*Dutch Boy Painter Magazine.*



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How to Clean Motors

A systematic and periodic cleaning of motors is necessary to insure best operation. Most motors are located where some sort of dust accumulates in the windings.

Some dusts are highly conductive, and lessen creepage distances. Other dusts are highly abrasive and actually cut the insulation when carried through by the ventilating air. Fine cast-iron dust quickly penetrates most insulating materials.

If conditions are severe, open motors might require some cleaning each day. For less severe conditions, weekly inspection and partial cleaning are usually sufficient.

For the weekly cleaning, the motor should be blown out with dry, compressed air (about 25 to 30 lb. per sq. in. pressure). Where conducting and abrasive dusts are present, even lower pressure may be necessary, and suction is to be preferred since damage can easily be caused by blowing the dust and metal chips into the insulation. On larger d-c. machines the air ducts should be blown out so that the ventilating air can pass through as intended.

The heavy dirt and grease should first be removed with a heavy, stiff brush, wooden or fiber scrapers, and cloths. Rifle-cleaning brushes can be used in the air ducts. Dry dust and dirt may be blown off, using dry compressed air at moderate pressure. Direct the air so that dust will not be pocketed in corners.

Grease, oil, and sticky dirt are easily removed by applying cleaning liquids such as carbon tetrachloride, gasoline, or naphtha. There are several good methods of applying the cleansing liquid. Probably the best method is to spray it on. Care must be taken not to soak the insulation by dipping coils or small motors into the liquid.

The insulation will dry quickly at ordinary room temperature after cleaning, but it is highly desirable to heat it to drive off all moisture before applying varnish. If the motor can be spared from service long enough, the insulation should be dried out by heating to from 90 to 100 C. (195 to 212 Fahr.).

While the motor is warm, a high-grade insulating varnish should be applied. For severe acid, alkali, or moisture conditions where oil or ducts are present, special varnishes can be supplied.

The varnish may be sprayed or brushed on. For small stators or rotors, it is best to dip the windings into the varnish, cleaning off the adjacent metal parts afterwards with a solvent. After applying the varnish,

the best results are obtained by baking for the length of time recommended by the varnish manufacturer, often from 3 to 7 hours at about 100 C.

If the machine must be put back in service quickly, or if facilities are not available for baking, fairly good results will be obtained by applying one of the quick-drying black or clear varnishes which dry in a few hours at ordinary room temperature.—GENERAL ELECTRIC COMPANY.

◆

Pointers on How To Pack a Stuffing Box

1. Remove all old packing from the stuffing box.

2. Clean box thoroughly, removing accumulations from walls.

3. Keep packing clean during application. The scoring of rods, shafts or sleeves, oftentimes, results from grit or foreign matter picked up by the packing.

4. Determine size of packing required by checking diameter of rod or shaft, and the inside diameter of the stuffing box. Rods wear and the packing has to compensate for this wear.

5. Never wind a length of packing into a stuffing box. Use packing in ring form only.

6. Cut spiral or coil from packing over a shaft or mandrel of exactly the same size as the one on which the packing is to be used in order to get close fitting rings.

7. Obtain sharp, clean cuts on soft packings that tend to squash or become ragged, by simply applying a small piece of friction tape at the place where the packing is to be cut. It is advisable to remove the tape when installing the rings. String also serves well for tying the packing on each side of where the cut is to be made and may be left on the packing when installed.

8. Cut all packing ring joints to a snug fit making the rings meet a tight butt or bevel joint.

9. Seat each packing ring carefully before placing the next one in the box. Loading a stuffing box with packing and and then pulling up on the gland follower, may cause excessive deformation of the first two rings, building up localized gland pressure and failure to seat the bottom rings so they can work effectively.

10. Install all packing rings so that the joints are staggered and kept approximately 90 deg. apart. Spot the joints in clockwise direction to facilitate locating them when removing the packing.

11. Pull up the gland follower, sufficiently tight, after the packing has been installed to insure final seating of the packing. The nuts should be backed off two or three turns to relieve excessive pressure. Adjust packing to operating conditions.

12. Keep the following in mind for stuffing boxes provided with water, oil or grease lanterns:

a. Make sure that the lantern is so located in the box that as the packing is taken up, the lantern will be advanced to its proper location with respect to the opening in the box.

b. Check to see that the opening into the stuffing box is free from obstructions so that the sealing water or lubrication can flow into the lantern.

13. Allow packing to leak a small amount, if possible, when starting a newly packed pump. Take up the gland slowly as the packing seats.

14. Provide means for lubricating the rod and packing wherever possible.

15. Finally, carefully wrap all extra packings, place them back in their container as a precaution against waste and the possibility of their picking up dirt and other injurious foreign substances.—JOHNS-MANVILLE.

◆

Protect Your Files When Not In Use

A file is a cunning tool. Unless it is carefully handled and safely stored, it will not give the service of which it is capable.

Do not permit files to be tossed into a drawer, left on a bench, or thrown together with other tools. If this is done, the file's keen cutting edge will be damaged. Good practice is to keep files separated, either by standing them with their tangs in holes in a

file box, or by hanging them in a rack. Or, they may be kept in conveniently partitioned wooden receptacles. New files should always be left in their protective wrappings or original boxes until used.—HELLER BROTHERS COMPANY.

◆

Running a Calender Without Sheet

A stack should not be allowed to run for long periods without the sheet in the machine. The rolls are very heavy and if small particles of stock, pitch, paper or anything hard stick to a roll, they will cause a bump or thud which amounts to more than a sledge hammer blow, hammering continuously until the sheet is back in the stack. This does not mean stopping the calender for every break, for that would be impracticable, but during wash-ups or any lengthy shut-down the stack should not be allowed to run.

When sheet is passing between the rolls, the paper (unless it is very thin) acts as a cushion, which saves the rolls from the full brunt of the blow. (Very thin paper provides little or no cushioning effect.)—*Booklet No. 114*, FARREL-BIRMINGHAM COMPANY, INC.

A Good Supervisor Does These Things:

1. Runs his department at a profit. Remembers profit is the difference between what goes into the product and the sales value of the product. The only way to increase profit is to decrease the cost of the input or increase the value of the output. This simple fact is often lost sight of.

2. Plans for the future.

3. Selects the most economical materials and supplies.

4. Uses all materials and supplies with minimum waste and to the best advantage.

5. Keeps all machines and equipment in good repair.

6. Replaces tools and equipment when it is economically wise to do so.

7. Studies needs from the standpoint of efficiency. Discovers and adopts better methods.

8. Looks at every problem from a cost viewpoint.

9. Watches the health of his workers.

10. Trains and up-grades his workers.

11. Watches out for his workers' safety.

12. Insists on good "shop housekeeping."

13. Uses his own time to good advantage.

14. Uses the latest and best equipment attainable wherever it will justify itself by lowered cost or improved results.

15. Eliminates waste in every form.

16. So handles his employes as to get maximum co-operation.—*Management Information*, ELLIOTT SERVICE CO., INC.

◆

Handling Crude Sulphur

Crude sulphur is very friable and frequent handling increases the percentage of fine material. As a result, losses are experienced in transferring sulphur, depending on the method of handling, amount of wind, and condition of equipment. These losses may reach as high as 0.5 per cent, during one transfer.

Sulphur may be stored in a dry bin, protected from the elements, for long periods of time without detriment. Storage in the open or in damp bins will result in the formation of some free sulphuric acid, as well as other contamination, in addition to the wastage from trampling that will inevitably occur.

Bulk sulphur, freshly broken at the vats, weighs approximately 84 pounds per cubic foot. After several handlings, this figure increases, owing to the tendency of the material to settle and pack. Sulphur stored for long periods in the open may weigh in excess of 90 lb. per cubic foot.

Sulphur dust and air, if in a confined space, constitute an explosive mixture. The latter may be detonated by a discharge of static electricity or a spark caused by metal striking against metal or stone. For this reason, many consumers using bucket elevator equipment are careful to line the bottom of the elevator "boot" with wood. Other users of sulphur employ belt conveyors to avoid the possibility of sparking. A further precaution is to install a series of vents in the casing of the conveying apparatus, the vents being set to open and dissipate the effect of any explosion.—*Sulphur, an essential to Industry and Agriculture*, TEXAS GULF SULPHUR CO., INC.

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Convention Papers . . . Abridged

This section includes abridgments of some of the papers read at the *Army and Navy* Conference, sponsored by *TAPPI*, in Chicago, September 21-24, 1943. Previous installments were published in the October, November, and December issues.

The Number of Fibers Per Gram of Pulp and Its Relation to Fiber Dimensions

JOHN H. GRAFF, Research Associate, The Institute of Paper Chemistry

In 1939, some work was done at the Institute to determine the number of fibers per gram of coniferous unbleached southern kraft pulp, counting both broken fibers and ray cells, the value found was 5,500,000 fibers per gram.

In a later work on the cross sections of pulp fibers (*Paper Trade J.* 111, no. 9:75-80, Aug. 29, 1940), it was found that the number of fibers per gram of pulp, if accurately determined, would be valuable in determining the unit surface area of a pulp; therefore, the present work was undertaken to study the different variables in determining the number of fibers, the standardization of the method, the probable error of one or more determinations, the time required, and the relationship of the count, if any, to fiber dimensions.

The following variables were standardized:

1) Samples were weighed at 65 per cent relative humidity.

2) Method of Dyeing the Fibers.

For the purpose of preparing strongly dyed fibers, two different methods were used.

(a) *Unbleached pulp.* One-half gram of pulp (weighed at 65 per cent relative humidity) was soaked in 50 cc. of distilled water, rolled between the fingers, and put into a 500-cc. Erlenmeyer flask for disintegration, using the original 50 cc. of water. The beaker was rinsed with an additional 50 cc. of water, which was added to the pulp in the Erlenmeyer flask.

The pulp suspension was then heated to 50 C., 5 cc. of a 2 per cent solution of Malachite green were added, and the suspension was gradually brought to a boil; after boiling for 10 minutes, 0.2 gram of tannic acid was added; the suspension was boiled for another 10 minutes, and water added to make 1000 cc.

(b) *Bleached pulp.* The dyeing procedure for bleached pulp was the same as for unbleached, except that 10 cc. of a 0.2 per cent solution of Congo red was used instead of Malachite green and, after boiling for 10 minutes, 0.5 gram of soda ash and 5 grams of sodium sulphate were added. The suspension was then boiled for another 10 minutes, and water added to make 1000 cc.

Table II—Unbleached Southern Pine Kraft

Count	1	2	3	4	5	6	7	8	9	10
Fibers	185	210	176	198	160	173	191	193	153	193

Average count, $183 \times 20{,}000 = 3{,}700{,}000$ per g. of pulp

S.D. of single counts $= 330{,}000 = 9.0\%$ S.D. of average $= 104{,}000 = 2.8\%$

P.E. $= 234{,}000 = 6.4\%$ P.E. $= 70{,}000 = 1.9\%$

Table III—Summary of Counts

Pulp	Number of fibers per g. of pulp	Standard Deviation: Single Count per cent	Standard Deviation: Average of 10 Counts per cent	Probable Error: Single Count	Probable Error: Average of 10 Counts
Unbleached southern pine kraft	3,700,000	9.0	2.8	6.4	1.9
Unbleached eastern jack pine kraft	6,700,000	5.6	1.3	3.9	1.0
Unbleached western hemlock kraft	5,500,000	5.1	1.6	3.8	1.1
Softwood western bleached sulphite	6,200,000	5.8	1.9	4.2	1.3
Softwood unbleached Mitscherlich sulphite	6,500,000	5.3	1.7	3.8	1.1
Unbleached balsam sulphite	8,400,000	4.4	1.3	3.5	0.9
Softwood eastern unbleached sulphite	8,700,000	7.0	2.2	5.0	1.5
Softwood eastern bleached sulphite	6,800,000	4.6	1.5	3.3	1.0
Softwood paper-grade Alpha	5,600,000	5.5	1.7	3.9	1.2
Rag filter paper	9,200,000	4.8	1.5	3.5	1.0
Hardwood bleached sulphite	22,400,000	3.6	1.1	2.6	0.8
Hardwood bleached soda	22,600,000	3.9	1.2	2.8	0.8
Hardwood paper-grade Alpha	22,000,000	5.0	1.5	3.6	1.1

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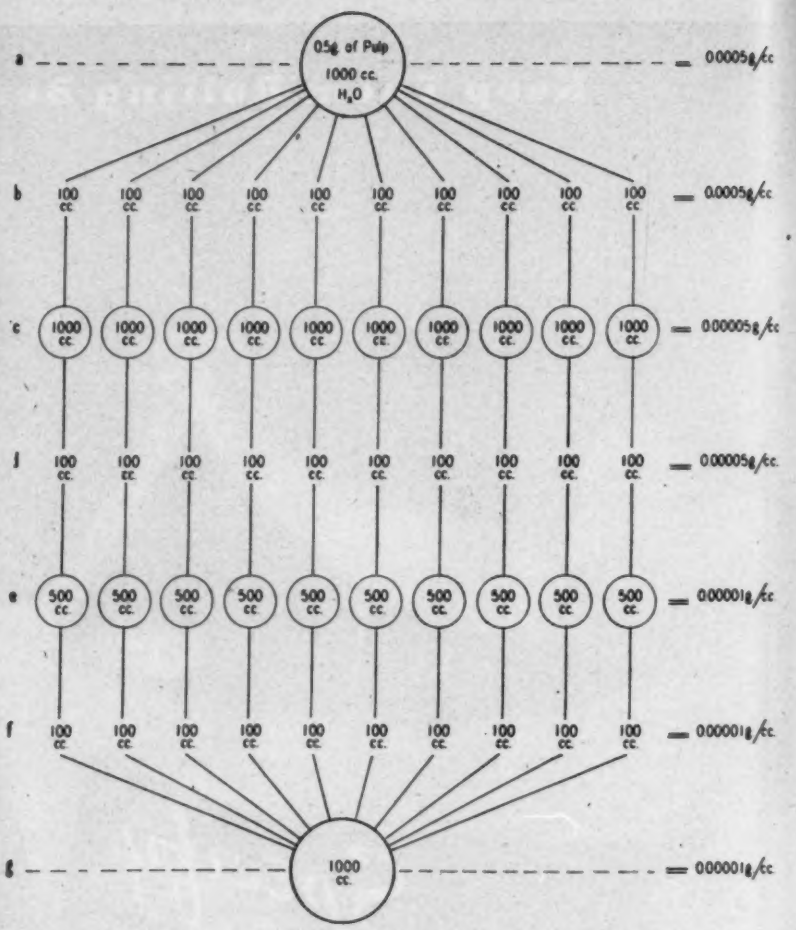


Fig. 1—Dilution for Coniferous Pulps

3) Dilution of Suspension

For coniferous pulps, the original 1000-cc. suspension of the dyed pulps was diluted as follows:

The 1000-cc. suspension (*a* in Figure 1) was divided into ten 100-cc. portions (*b*); each one of these 100 cc. was diluted to 1000 cc. (*c*). From each of these 1000-cc. portions, 100 cc. were taken and diluted to 500 cc. (*e*); from each of these 500-cc. suspensions, 100 cc. were taken and combined, making a final 1000-cc. suspension containing 0.00001 gram of pulp per cc. (*g*).

For deciduous pulps, step *e* in Figure 1 was changed so that the dilution was 1000 cc. instead of 500 cc., giving a suspension at *g* of 0.000005 gram of pulp per cc. of suspension.

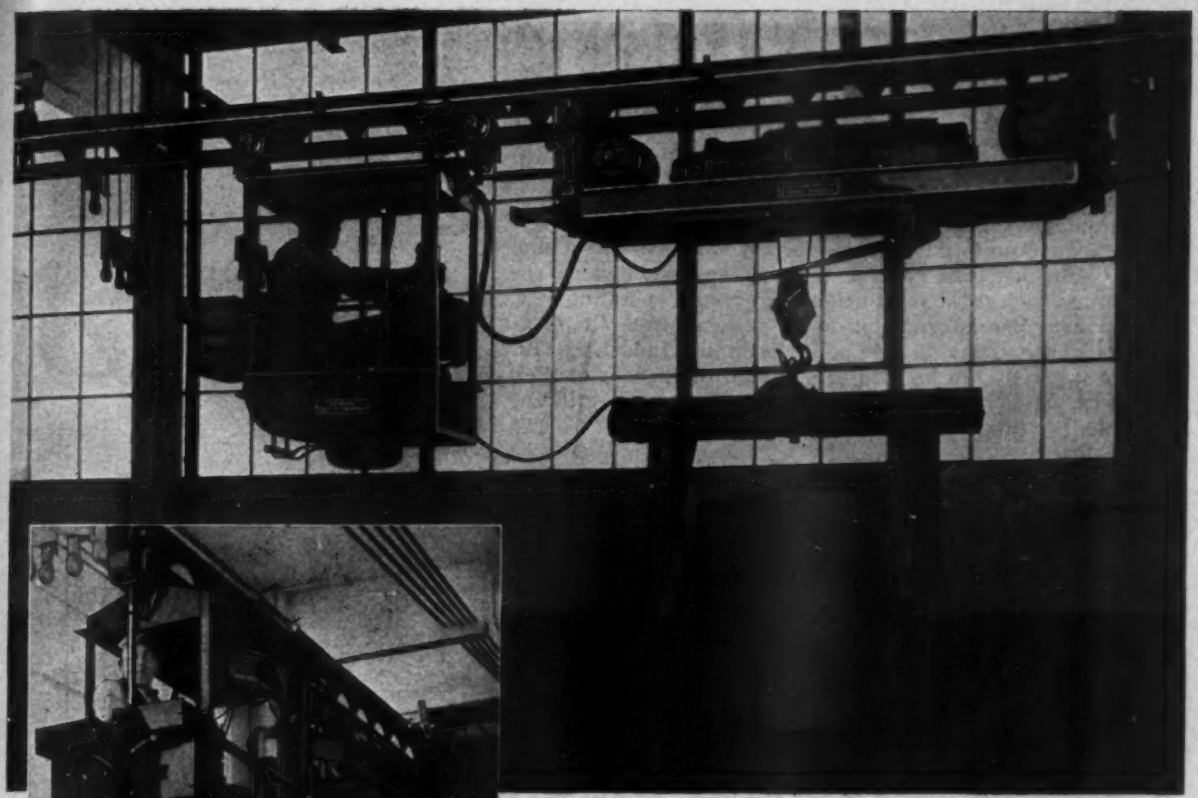
4) Sampling

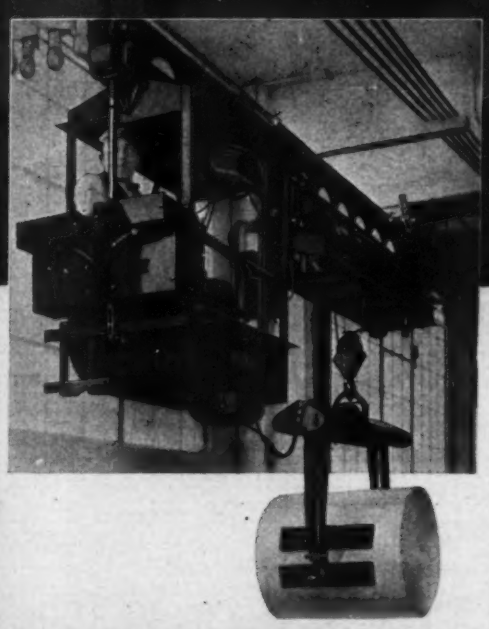
The graduated pipet used for sampling had an inside diameter of 7:5 mm. and was restricted at the bottom end to 5 mm.

The suspension was shaken vigorously;

Table V—Counted and Actual Number of Fibers per Gram of Pulp

Name of Pulp	Counted Number of Fibers above 0.1 mm.	Calculated Number of Fibers above 0.0 mm.
Unbleached southern pine kraft	3,700,000	4,500,000
Unbleached eastern jack pine kraft	6,700,000	12,400,000
Unbleached western hemlock kraft	5,500,000	5,800,000
Softwood western bleached sulphite	6,200,000	9,100,000
Softwood unbleached Mitscherlich sulphite	6,500,000	11,100,000
Unbleached balsam sulphite	8,400,000	9,500,000
Softwood eastern unbleached sulphite	8,700,000	9,500,000
Softwood eastern bleached sulphite	6,800,000	8,900,000
Softwood paper-grade Alpha	5,600,000	6,900,000
Rag filter paper	9,200,000	9,300,000
Hardwood bleached sulphite	22,400,000	59,000,000
Hardwood bleached soda	22,600,000	38,000,000
Hardwood paper-grade Alpha	22,000,000	38,000,000





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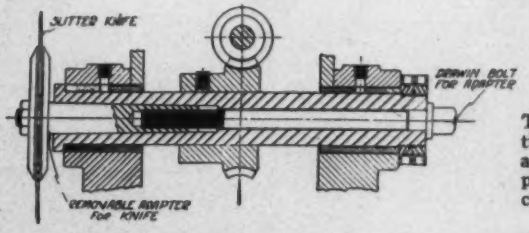

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with one finger over the top end of the pipet, it was immediately inserted in the suspension to a depth of 11 cm. The finger was removed and 5 cc. of the suspension were allowed to rise into the pipet, the top end was closed with the finger, and the volume transferred to a clean lantern slide cover glass 3¼x4 inches, on which a square 8.5x5.5 cm. had been marked with aluminum stearate.

The suspension was spread inside the square, the slide placed on a hot plate, and the fibers distributed by tapping the suspension with a dissecting needle.

When the fibers were dry, the slide was covered with another lantern slide cover glass to prevent dust, etc., from settling on the fibers.

5) Counting

The lantern slide with the dried fibers was placed on a white lacquered metal plate and the whole was placed under a Greenough binocular microscope. Using a magnification of seven diameters, the fibers on the slide were counted. The ruled squares on the lacquered plate assist materially in making the counts.

The number of fibers in each 5-cc. portion taken from the final suspension (*g* in Figure 1), multiplied by 20,000, equals the number of fibers per gram of coniferous pulps, and, multiplied by 40,000, equals the number of fibers per gram of deciduous pulps.

However, as it is very difficult, at a magnification of seven diameters, to differentiate between fibers less than 0.1 mm. long and dust and debris, a micrometer

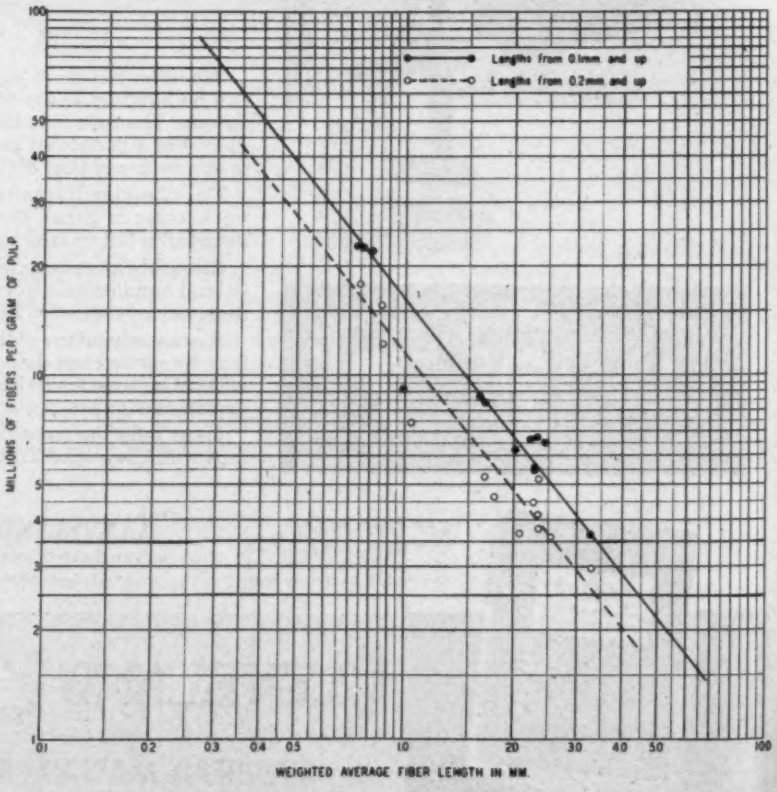

FIG. 19 — CORRELATION OF WEIGHTED AVERAGE FIBER LENGTH TO MILLIONS OF FIBERS PER GRAM OF PULP

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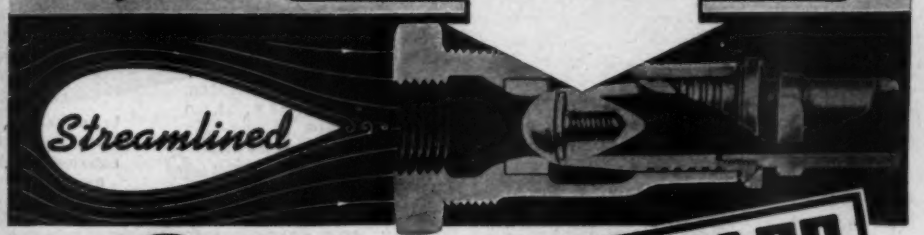

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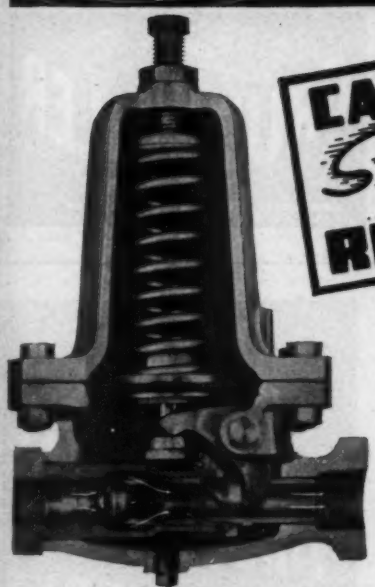

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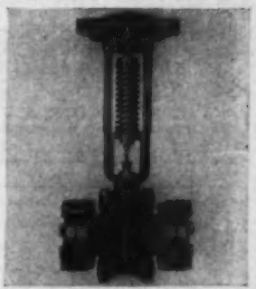
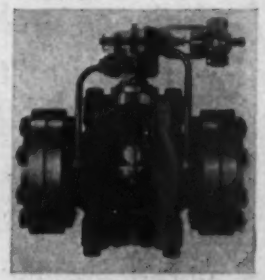


Cash Standard Type 34, Pressure Reducing Valve. For practically all fluids. Sizes: ½" to 12" inclusive. Highest initial pressure 800 lbs.; reduced pressure, vacuum to 150 lbs.
Has roller guides, roller bearing — no lost motion.
Bodies: iron, bronze, steel. Trim: iron, bronze, stainless steel. Ends: screwed, flanged, ammonia type, welding type.



Cash Standard Type 11 Regulator, for use with water, air or any gas or oil that is non-corrosive. Pressure to actuate pilot valve may come from any source; and be as high as 1500 lbs.
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scale was placed in one of the eyepieces so that fibers less than 0.1 mm. were not considered in the count.

After the different steps of the procedure had been standardized, the number of fibers per gram of pulp was determined for thirteen pulps.

Table II shows the results of the counts for one of these pulps. The summary of the counts, standard deviations (S.D.), and probable errors (P.E.), using ten counts of 5-cc. suspensions, is shown in Table III.

This table shows that the number of fibers per gram of pulp varies considerably.

Of the total fiber content, 47.6 per cent by weight* consisted of whole fibers with lengths from 0.45 to 4.25 mm., 48.5 per cent by weight consisted of broken fibers with lengths up to 3.25 mm., and 3.8 per cent by weight consisted of ray cells and fragments. These figures show the importance of considering all fibers when comparing the number of fibers per gram of different pulps.

A study of the standard deviation and the probable error of the counts, both for single count and for the average of ten counts of the different pulps shows that the method of counting is fairly accurate and dependable, even for single counts; for the average of ten counts, the standard deviation and probable error are very small for work of this kind. Therefore, if it should be desired to determine the effect of chipping, cooking, purification, or beating on the number of fibers per gram of pulp, such counts can be carried out with the assurance that the values obtained will be dependable for purposes of comparison.

6) Time Required

The weighing, dyeing and disintegration of a single sample take about 1 hour. However, as several samples can be prepared at the same time, this can be materially reduced.

The counting of a single slide takes from 5 to 10 minutes; therefore, 10 slides of a single sample should easily be counted in 1 or 2 hours.

For the purpose of determining the average fiber dimensions of each pulp, the total length and area of the fibers in a gram of pulp, and the relationship, if any, between fiber dimension data and fiber counts, fiber dimensions were determined for all of the pulps and the number of ray cells in each of the coniferous pulps was noted.

The differences between the number of fibers counted and the number of fibers of all sizes in the pulp are shown in Table V.

Although the number of fibers per gram and the average fiber dimensions a given pulp may be of value for comparative purposes, the real interest is in the interrelationships between the number of fibers per gram of pulp, average fiber length and width, length/width ratio, average fiber area, total fiber length, and fiber area.

From time to time, the question has been asked: What are the shortest fibers

*In this paper the term weight means the product of fiber length and width; it is therefore not literally weight, but an area.

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that should be taken into consideration? Therefore, all these data were compiled separately for all the fibers found, and for those 0.1 mm., 0.2 mm., and 0.3 mm. and longer. These data reveal that the largest number of correlations and the best ones —that is, those most intimately related to the factors having a bearing upon the comparative values sought—are those obtained for fiber lengths from 0.1 mm. and 0.2 mm., and longer.

There is a definite relationship between the weighted average fiber length of fibers longer than 0.1 mm. and the number of fibers per gram of pulp (Figure 19). Because of this relationship, the total fiber length and the area of a given amount of pulp can be calculated from ordinary fiber dimensional data without counting the fibers. This, in turn, may make it possible to determine the effect of chipping, cooking, different beater treatments, bleaching, and probably also the relationship between such data and the physical characteristics of the finished paper.

Packing Mechanical Parts

H. H. SNYDER, Packaging Engineer
Stewart-Warner Corporation

Previous to the war Stewart-Warner was making a variety of some fifty-thousand items which varied in size from tiny flakes of metal to a lubricating unit that weighed a ton or so; and varied in nature from delicate mechanisms to heavy castings.

It is surprising to see this same plant today and to note the large percentage of peacetime items adaptable to the war effort. There were changes of course, many of them, but in general nearly all are adaptions or outgrowth of peacetime items.

The packaging of such a wide variety of parts offers many problems. The solutions of most of these problems centers around paper and its uses.

The papers we use at the plant for packing generally fall into one of the following classes:

1) Government export papers
2) Non-abrasive papers
3) Rough papers
4) Box liners
5) Container stock
   (a) Folding
   (b) Set-up
   (c) Fibre

Government expert papers, that is grade "A," "B," and "C" papers have become quite a familiar subject to many of us. The first two of these papers are very easy to handle according to government instructions while grade "C" is another matter. The makers of many grade "C" paper have been trying so hard to conserve wax that it is almost impossible to obtain a seal sufficiently strong to qualify for our standards of a method IA pack. In order to wrap irregular shaped items in this paper, it is quite necessary that the paper in itself be tacky enough to adhere to itself under pressure and form a seal. Method IA pack has two main weaknesses; one of them is the fact that items with large voids or air spaces will rust through condensation of the humidity trapped in such a void; second, in wrapping metal parts, especially

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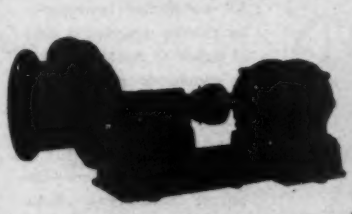

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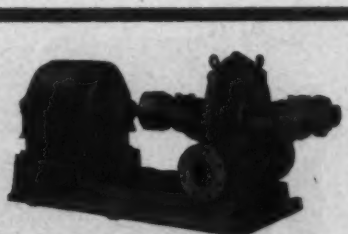

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steel, in most grade "C" paper the expansion of the metal is great enough to cause a complete break in a wrapper, unless a gusset or a bellows is formed in the wrap.

Many grade "C" papers do not meet the moisture vapor transmission standards for a Method II pack. On very small quantities of Ordnance Department of Engineers material we have used quite a large percentage of our grade "C" paper for this purpose. However, this is not practical on large runs due to the amount of labor involved.

We use a large amount of tissue and wadding for the protection of painted surfaces and as cushioning on very delicate and mechanical parts. These types of papers give an exceptional amount of protection.

We ship most of our large items in wood, plywood or wire wound boxes. Most of these boxes are lined with waterproof paper. The choice of these papers depends almost entirely upon the abuse or scuffing we expect the paper to take. Small regular shaped items do not require a very strong waterproof paper; whereas items of great weight and of irregular shape must be wrapped in stronger paper to prevent them from breaking through. The waterproofness of box liners is not too thoroughly defined in most specifications with the exception that the amount of asphalt required in their manufacture is specified. The most important thing in a sheet of this type is to see that the asphalt is impregnated into the sheet well enough so that bleeding will not take place under higher than normal temperatures.

We use all types of boxes, such as folding, setup, corrugated and fiber boxes, as well as a few waterproof bags that we make ourselves. The types of boxes and their design combined with special inner packing is a subject that could never be covered too thoroughly. We must understand the function of the box manufacturers machinery. We must know the hazards in which each package must be subjected. We must consider the time for assembling on our plant and also the manner of packing and unpacking of the merchandise. The thing that bothers most today in the use of boxes is the shortage of material. Many Government orders will soon be lying useless in our plants if something is not done soon to remedy this condition.

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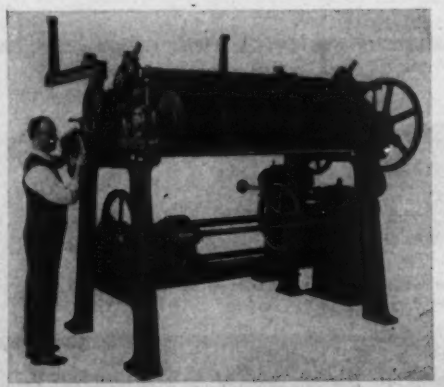

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The Corrosion Problem and How It May Be Solved

HERBERT B. McKEAN
Technologist, Forest Products Laboratory

Proper protection of metal and metal parts from corrosion is an integral function of packaging. This fact is particularly true of overseas shipment of war materials. In packaging courses given for authorized representatives of the Army, Navy, and manufacturers, the Forest Products Laboratory places great stress on methods and materials for corrosion prevention in packaging for overseas shipment.

The most important single cause of corrosion is the combined action of oxygen and moisture. Moisture or high humidity alone does not cause rust. It has been demonstrated that both oxygen and moisture are required to cause corrosion. The fact that moisture is the more easily controlled of the two, is exploited in Method II packaging, in which the relative humidity inside a vapor-proof barrier is maintained at a point lower than 30 per cent.

Another cause of corrosion is acid or acid fumes. Probably the most troublesome acid of all is that present in human perspiration. Much difficulty in preserving parts arises from perspiration acid which gets on metal as a result of handling.

One other so-called cause of corrosion which is worth considering here is that generally attributed to salt water or salt atmosphere. Actually, salt water is not a corrosive agent. The corrosion is simply caused by the combined action of oxygen and moisture, with the salt acting as a catalyst to hasten the reaction.

An often overlooked, but nevertheless very important step in the proper preservation of metal is thorough cleaning prior to the application of preservatives. If corrosive materials are left on the surface of a part and a corrosion preventive applied over them, it will only serve to protect the corrosive material from being removed rather than protecting the part itself. Without thorough cleaning, metal parts might just as well not be preserved.

For the purpose of this discussion, two classes of cleaning, solvent and alkaline, will be considered. There are a number

of procedures for each class. Three commonly used procedures, immersion cleaning, spray cleaning, and vapor degreasing, are used in solvent cleaning. Solvent immersion cleaning, as the name implies, is accomplished by immersing the parts in the cleaning solution. Immersion cleaning may be done in either one or two steps. In the one-step procedure, one tank of solvent is used and the parts are immersed in this solvent. This is the least effective of all the solvent-cleaning procedures because, as dirt from parts is accumulated in the tank, it finally may be added rather than removed from metal unless the solvent is replaced frequently.

To overcome this difficulty, the two-step immersion method can be used. With this method, two tanks of solvent are needed. The first tank removes most of the dirt so that the second tank remains relatively clean over quite long periods of use. In this way the part is given a preliminary cleaning in the first tank and is thoroughly cleaned in the second. With either immersion method, washing with solvent soaked rags or brushing will be necessary to remove completely many contaminates. The solvent used with this type of cleaning should be a neutral, water white petroleum distillate having a minimum flash point of 105 Fahr. (Stoddard solvent or dry cleaners' naphtha).

Solvent spray cleaning uses the same solvents needed for immersion cleaning, but in many respects is more satisfactory. This is true because the mechanical action of the spray is of assistance in removing certain contaminates, particularly inorganic materials.

In all cleaning operations where Stoddard solvent or naphtha is used, precautions must be taken against fire, as these are highly inflammable materials. For the same reason, they should not be heated for cleaning operations.

Vapor degreasing is one of the most satisfactory procedures for cleaning parts, primarily because only clean solvent ever comes in contact with the part. Another advantages is that the temperature of the part is raised during the cleaning operation, so that the solvent dries rapidly when the cleaning is completed. The simplest form of vapor degreaser consists of a tank in which a solvent, such as trichlorethylene or perchlorethylene is placed for heating. The solvent is heated by steam coils or other means and as it evaporates the vapor collects above the liquid in the tank. As the vapor accumulates it rises in the degreaser until it comes in contact with a water jacket near the top of the apparatus. The cool surface condenses the vapors, which then flow back into the bottom of the equipment. The part that is to be cleaned is placed in these vapors. As the part is cold, some of the vapors condense on its surface in sufficient quantity to flow and pour back into the tank. While flowing over the part, the solvent removes the contaminates. This procedure may be carried a little further by immersing the parts in a hot rinse to complete the cleaning.

Occasionally, a third step is introduced in which the parts are again suspended in the vapors for a final cleaning. As solvents will not neutralize the perspiration acids,

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methanol, containing about 5 per cent water, is required as a final rinse whenever finished surfaces have been handled by bare hands.

Several types of alkaline cleaning are popular. The simplest of these is alkaline immersion cleaning, which is accomplished by immersing the part to be cleaned in the hot solution. Another procedure is to spray the parts to be cleaned with the hot alkaline solution. These methods are frequently combined to get more thorough cleaning, as the mechanical action of the spray is particularly effective in removing certain types of contaminates.

A third method of alkaline cleaning is called alkaline electrocleaning. By this method, electric current is employed to provide more thorough cleaning. The process, if properly controlled, may even be used for rust removal. One formula for alkaline cleaners that has been found satisfactory in some plants is:

	Per cent
Sodium Carbonate, Anhydrous	46
Trisodium Phosphate	32
Sodium Hydroxide	16
Rosin	6

Six to ten ounces of this mixture should be added to a gallon of water.

Immediately following any alkaline cleaning process, parts should be rinsed in hot water at not less than 180 F. Normally, the rinsing tank should be kept constantly overflowing to prevent formation of scum on the surface of the water. Following the rinse, the parts should be immediately dried either in an oven or by dry compressed air, or, if these are not available, wiped with clean cloths.

Following the cleaning procedure, either of two classes of preservative treatment may be used. One class is called Method I preservation. This method involves the application of a particular type of greasy or oily material to the surfaces to be protected. In industry, it is frequently called "slushing." This type of preservation is the major topic of this discussion. Another type, called Method II, accomplishes its purpose by means of dehydration, but no discussion of this type will be given here.

A number of different materials may be used in Method I preservation. One is a heavy petrolatum, covered under Specification No. U.S.A. 2-82-c and Army-Navy Specification AN-C-52. According to these specifications, this material must have a minimum melting point of 150 Fahr. It should be applied at a temperature ranging from 280 Fahr. to 210 Fahr. Heavy petrolatum is an extremely good preservative for metal that may be subjected to any unusual corrosion hazard. It is reported by engineers that this preservative will give satisfactory results on metal exposed to the weather for a year or more. Heavy petrolatum requires rubbing in addition to simple solvent action for its complete removal. For this reason, heavy petrolatum should not be used for preservation of any part that has surfaces that cannot be reached with a swab to wipe it off.

Another preservative that is widely used is light petrolatum. Descriptions of this material are found in Specifications U.S.A. 2-84-b. According to the specifications the minimum melting point is 120 Fahr. Application should take place between 150 Fahr. and 180 Fahr. This light petrolatum contains rust inhibitors and resembles ordinary light-weight lubricating grease in appearance but not in properties. It was designed primarily to provide protection against corrosion under the conditions normally met in the warehouse. Since all boxes for overseas shipment of war supplies are to be lined with a waterproof paper, each container is, in effect, a warehouse. This being the case, light petrolatum is ideally suited for the preparation of materials for shipment. It can be used safely on almost any bright metal part except possibly assembled bearings.

A third preservative is a cut-back material which derives its name from the fact that it is a preservative dissolved in a solvent. This material is liquid at room temperature. It is made to conform to tentative Specification AXS-673 and Type I preservative of AN-C-52. Cut-back preservatives may be applied by dipping at room temperature. Upon removal from the dip, the material dries as a result of the evaporation of the solvent, leaving a tough, thin film. When thoroughly dried, this preservative provides the most abrasion-resistant film of any of the preservatives now available. After several weeks' exposure to the atmosphere, it resembles paint in film thickness and appearance.

One group of preservatives is known generally as preserving and lubricating oils. They are covered under a number of dif-

ferent specifications and represent a rather broad range of viscosities. Each type, however, has a specific function. One material is a concentrate which is added in certain proportions to lubricating oils. This solution is used as the lubricant during the last 15 minutes of a test run for aircraft engines. This preservative possesses not only preservative and lubricating properties but acid-neutralizing materials. For lubrication and preservation of truck and stationary engines, the Army Ordnance Department has a somewhat similar material which is provided by the manfacturer with rust inhibitor and acid neutralizer already added. This oil requires no mixing by the user.

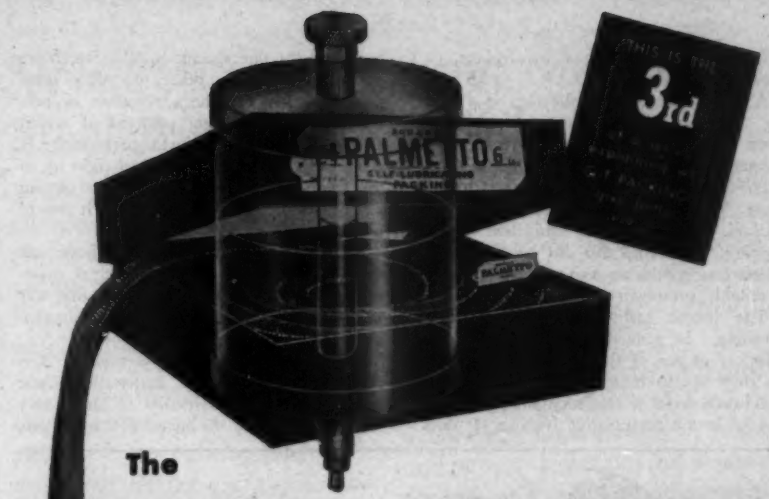
Two very light grades of preserving and lubricating oils, developed for specific purposes, differ from the previously-mentioned oils not only in having lower viscosities but also in that they contain no acid neutralizer. These materials have been developed essentially for the preservation and lubrication of the working parts of automatic rifles during service.

There are four methods by means of which these preservatives can be applied. Probably the best is the hot dip. The greatest advantage of this method is that the preservative is heated enough to remove any moisture that may be adhering to the part. This procedure is limited, however, to the petrolatum type of preservative. As a general statement, it can be said that, for the heavy petrolatum, a film thickness of 1/32 inch is desirable and, for the light petrolatum, a 1/64-inch film is optimum. To obtain these desired coatings, it is generally necessary to develop a time-temperature relationship for the particular part being preserved. A small part dipped in a bath of a light petrolatum at 160 Fahr. might obtain the desired film thickness in a relatively short immersion. A larger part, however, might require two or three times as long because of the greater mass of metal that must be heated. No hard and fast rule can be made regarding dipping time.

Another method of application, which may be used with all of the preservatives mentioned, is spraying. This method is relatively simple with the cut-back preservative or the preserving and lubricating oils. On the other hand, to apply petrolatum preservatives with a spray gun requires some means of keeping the material liquid in the spray gun. The best way of accomplishing this is to have a heated container on the spray gun. Many operators keep the material liquid by adding solvents to the melted petrolatum, but this procedure is not generally recommended.

A necessary adjunct of any spraying apparatus is a vapor trap in the air line. Such a trap, which contains a dehydrating agent, is necessary because a relatively large quantity of vapor is trapped in compressed air. To determine the effectiveness of the vapor trap, all that is necessary is to blow the air from the air line on a piece of clean bright metal. If condensation occurs on the metal, the vapor trap is inadequate, if the metal remains dry, the vapor trap is satisfactory.

Spraying is particularly effective with parts that are too large to be dipped, such



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as the exterior surfaces of an airplane, or a cylinder block.

A third method of application is a cold dip. This procedure can be used only with those preservatives that are liquid at room temperature. The process provides a thorough coating but has no tendency to remove water, as does the hot dipping method. Otherwise it is equivalent to hot dipping. The cold dip can be used with satisfactory results on any part treated with a suitable preservative.

The fourth method of application is brushing. In general, this is the least satisfactory of any of the preserving methods. Its chief shortcoming is that the bristles of the brush have a tendency to make thin streaks in the preservative coating. It does have at least one specific application, however, for which the other procedures cannot equal it. For the application of preservatives to any item, portions of which should not be touched by the preservative, it is possible with the brush to get right up to the edge of the bare metal without getting any of the preservative on surfaces it should not touch.

If the procedures outlined above are carefully followed, using the proper materials, it can be reasonably expected that war materials will arrive overseas in usable condition.

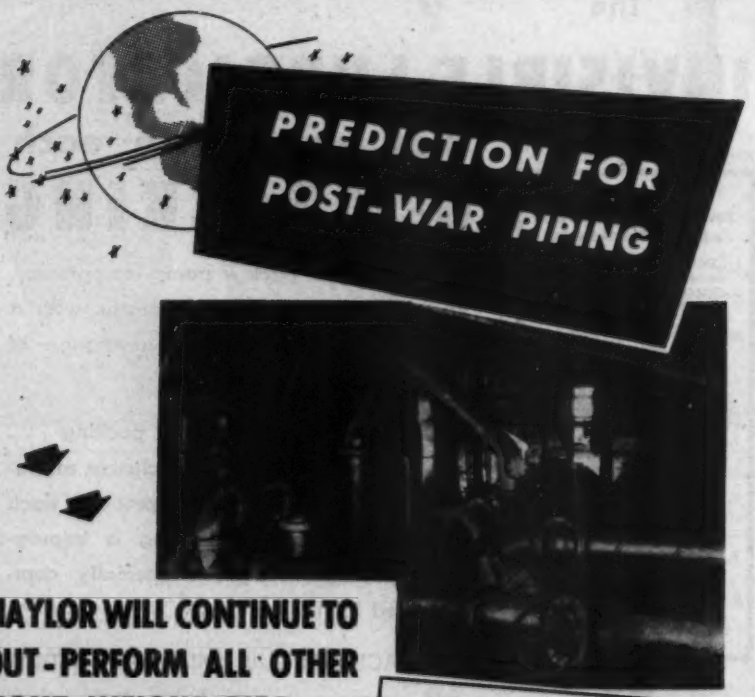
In addition to proper preservation, it is necessary to use other materials if war supplies are to be delivered in satisfactory condition. After the part has been preserved, it must be wrapped in greaseproof wrapping and shipped in a box lined with a waterproof paper.

Two specifications in current use set up the standards which must be met by these greaseproof materials. These specifications are AN-P-12a, entitled, "Paper; Greaseproof Wrapping," and AXS-840, Revision 1, entitled, "Wrapping; Greaseproof." In the former, two grades, A and B, are recognized. The latter specification lists three grades, A, B, and C. Both specifications prescribe a number of requirements which must be met by greaseproof wrappers. It is required that in AN-P-12a the material be resistant to the passage of turpentine for 1,200 seconds on a flat sheet. Specification AXS-840 requires that the turpentine resistance shall be 300 seconds on a folded sheet. There is also a limit stated for the amount of sulphur trioxide permitted in the paper. Furthermore, it is required that the sheets have sufficient strength to avoid tearing during wrapping. Grades A and C must have a *p*H value of between 6.5 and 7.5. Grade B, however, may have a *p*H range between 5 and 8. Grade A or C paper in itself will not prevent corrosion. Because they are neutral, grade A or C wrappers only should be used for wrapping parts having highly finished surfaces on which even the slightest amount of corrosion might destroy the usefulness of the part. Grade B, on the other hand, should be used only on those materials where close tolerances are not necessary, such as castings and forgings. Grade A is always colored red, Grade C is green, and grade B is an unpigmented sheet. Where color is required it may be solid or striped. The purpose of the color is primarily to assist the packer in quickly determining which paper he is using.

Grade C, up to this point, is exactly like grade A, except in color. It has, however, two additional properties which make it different from grade A. In the first place, it must be tacky so that it is more or less self-sealing. In the second place, it should be moldable so that a crease can be made in the sheet and there will be little or no spring-back. There is nothing whatsoever in the specifications that requires these materials to be moisture-vaporproof. Until the materials have been proven to be vaporproof and are accepted by the various agencies of the armed forces as vaporproof materials, they should not be used as vaporproof barriers in conjunction with Method II preservation.

The wrapping of parts in grade A or B sheets is not intended to provide a waterproof or vaporproof wrap. On the contrary, it should be so applied as to permit any water that may get inside the wrapper to drain out or evaporate readily. Sealing of the A or B grades is accomplished by a gummed tape which is applied in a manner that will merely prevent the paper itself from unfolding and exposing the part. Such a seal will leave most of the outside edge of the wrapper unsealed.

Grade C wrappers are used to provide what is called an "intimate wrap." The wrapping material is in full contact with all exterior surfaces of the part. Generally these packages are dipped in a wax sealer to provide a waterproof container known as



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a I-A pack. An I-A package also may be provided by any material that can provide a waterproof covering. In other words, any waterproof sheet that can be satisfactorily sealed may be used to make this type of wrapping.

The last step in packaging that has any effect in preventing corrosion is the lining of the container with a waterproof paper. There are a great many papers available for this purpose. Almost all of them consist of at least two layers of paper with a film of asphalt between them. The water resistance of these sheets varies widely, but for overseas shipment it is desirable to use sheets that resist the passage of water for at least 48 hours as determined by the dry-indicator method. In the light of experience acquired during recent months, the prefabricated bag has become the most desirable way of applying waterproof box liners.

If meticulous care is exercised in the application of all these materials, it should be possible to ship war supplies of a metallic nature to any place in the world without fear of the parts being damaged by corrosion.

The Role of Fiberboard in the Packaging of War Material

ROBERT A. COCKRELL
Technologist, Forest Products Laboratory

Fiberboard containers have many desirable characteristics that insure their continued importance in the packaging of war material. The Forest Products Laboratory has tested material and designs of such containers for many years and is now engaged in extensive research and test work on them for the Army, Navy, War Food Administration, and other war agencies as well as manufacturers.

The principal shortcoming of fiberboard containers prior to the war was lack of resistance to moisture. When exposed to rain or to high relative humidity, the board absorbed moisture with consequent loss of mechanical strength. This weakness of fiberboard must be reckoned with in shipping supplies overseas because of the ever present probability of exposure to high humidity and rain both in transit and storage. Shipments of supplies packaged in the ordinary domestic grades of fiberboard early in the war immediately focused attention on this problem.

The first attempt of the fiberboard industry to improve the moisture-resistant properties of fiberboard with the development of the weatherproof grade of solid fiberboard, although providing a product better than the ordinary domestic board, still fell short of furnishing the moisture resistance desired. Following this, a new type of fiberboard, known as "V board," was developed which had reasonably satisfactory moisture resistance.

Even with the "V board," however, absorption of moisture is still a problem, for, although the board holds together well when wet, in this condition it lacks stiffness and cannot be depended upon to protect the contents or support stacking loads. Obviously, there is still a real need for the

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In your own wood room, Amsco manganese steel conveyor chains for all purposes will reduce shutdowns for repairs and show the lowest ultimate cost.

Write for bulletin on the applications of manganese steel in the lumber industry and in paper mills.

R-269. Construction of 6" pitch barking drum chain, cast manganese steel links and forged steel pins.

C-279. Perspective view of Amsco barking drum chain, 6" pitch.

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development of a grade of fiberboard that will retain a reasonably high degree of rigidity when wet. Research aimed at developing a more water-resistant board is under way at the Forest Products Laboratory and definite progress is being made.

Although the production of corrugated containers in recent years has far surpassed that of solid fiberboard for domestic use, a decided trend is evident in industry toward the use of solid fiberboard exterior export containers made from high-quality paperboard. Corrugated board is considered to have superior shock-absorbing qualities that adapt it admirably to the packaging of light, fragile articles and to use as an interior container, but the more substantial solid fiberboard is better suited to resist the rough handling, abrasion, and severe stresses likely to be imposed under wartime export shipping conditions.

Fiberboard interior containers are especially convenient for packaging small parts or sets of parts and serve as unit containers within a larger and sturdier exterior container. Single- or double-wall corrugated board or solid fiberboard are all acceptable, providing, of course, that they meet the specifications called for by the agency concerned. These requirements, as set forth in the Army-Navy General Specification for Packaging and Packing for Overseas Shipment, are appreciably higher than those of Rule 41 of the Consolidated Freight Classification for fiberboard containers. The maximum weight of box and contents for single-wall corrugated and solid fiberboard is limited to 70 pounds, and for double-wall corrugated board the limit is 100 pounds. Fiberboard meeting water-resistance requirements for this specification must have a bursting strength after immersion in water for 24 hours equal to at least 50 per cent of that specified for normal atmospheric conditions. For the same immersion period, ply separation is limited to ¼ inch, measured from the edge. Fiberboard meeting all the requirements of the specifications except that for water resistance, however, is acceptable, providing the interior container is wrapped and sealed in waterproof paper.

Practically all the well-known box styles can be used for interior containers provided they bear the boxmaker's name, the allowable gross weight limit, and a statement of compliance with the specification. The body joints of the slotted cartons are to be made with metal fasteners when the fiberboard meets the moisture-resistance requirements; otherwise cloth or sisal gummed tape may be used. Slotted-style boxes may be closed with metal stitches, adhesive applied to the flaps, or gummed tape applied to all the seams, while design style or triple slide boxes may be closed with metal bands or gummed tape.

When shipments reach their overseas destination and are unpacked for use or further distribution, the interior containers often become exterior containers for material forwarded to troops or stored at depots. Since under such conditions the containers may be exposed to moisture, it would be preferable whenever possible to use a grade of board with high moisture resistance and a moisture-resistant closure in order to insure continued serviceability.

Since one of the primary requisites for an exterior export container is high resistance to moisture, the only type of fiberboard permitted by the Army-Navy General Specification is the new "V board." This differs from ordinary domestic types of fiberboard and the more recently developed weatherproof board by having a relatively high bursting strength when wet, the better grades meeting a minimum bursting-strength test of 500 points after 24 hours' immersion in water, with a maximum permissible ply separation of ¼ inch.

Only the regular, center special, and overlap slotted styles and the full telescope design style are acceptable for these exterior containers, which must be constructed of solid fiberboard or B- or C-flute corrugated board. With the best grade of board, these are limited to a gross weight of 70 pounds and a maximum sum of inside dimensions of 70 inches.

The body joints of the slotted containers must be made with metal fasteners and the closures with either metal fasteners or a water-resistant adhesive properly applied to the flaps. The closure is then reinforced with metal bands applied both girthwise and lengthwise of the box or by combination of a fiberboard sleeve encircling the box lengthwise over the top, bottom, and ends and one or more metal bands applied girthwise over the sleeve. On all containers a boxmaker's certificate must be imprinted and in addition there must be the month and year of manufacture and evi-

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dence of compliance with the "V board" specification.

Although not yet authorized by general specifications, wood-cleated fiberboard containers have been developed that are similar in construction to the wood-cleated plywood export cases. Tests conducted with these boxes at the Forest Products Laboratory indicate that, when made with the better grades of "V board" and reinforced with lengthwise bands, they have real possibilities for export shipping cases. The wood cleats provide edge and corner reinforcement and stiffen the box so that it can sustain most stresses imposed by handling or stacking.

One of the most important aspects of wartime export packing is the proper use of interior reinforcing and cushioning material to protect the contents from the shocks of rough handling and hold them firmly in place within the container. Corrugated board has come to be extensively used for this purpose. Depending on the requirements for particular situations, A-, B-, or C-flute, single- or double-wall board, or single-faced paper may be employed. As with the fiberboard used in containers, resistance to moisture is probably the most important physical property to be considered. The Army-Navy specification requires that single- or double-wall corrugated board, after 24 hours' immersion in water, have a minimum bursting strength equal to 50 per cent of that at normal conditions, but, in no case, can it be less than 100 points. When the board is not subjected to tensile or tearing stresses, however, the minimum wet bursting strength is reduced to 75 points. Single-face paper is required to have a wet bursting strength of at least 30 points. It must be kept in mind, of course, that a high wet bursting strength does not signify that the board will have any appreciable degree of rigidity when wet. Hence, corrugated board used for cushioning or blocking in export packs must be protected from moisture to perform its function.

CORRECTION

The convention paper abridgment entitled "The Nature of Lignosulphonic Acids Fractionated by Chemical and Physical Methods" (TAPPI fall meeting), which appeared on page 1036 of the December, 1943, issue of this magazine, carried the name of Willis M. Van Horn, research assistant, The Institute of Paper Chemistry, as author. This was an error; the author of that paper should have read "W. Allen Schenck, A.P.W. Paper Company."

Water-Resistant Tapes for Export Packaging

BURTON LEE TRODSON
Mid-States Gummed Paper Company

Two types of water-resistant sealing tapes, designated individually as Types A and B, have been developed to meet the packaging needs of the Armed Forces.

Type "A" Tape consists of a 60-lb. high wet strength kraft paper, coated one side with a synthetic resin adhesive that requires a special solvent to moisten. While this type of kraft paper does not prevent moisture vapor transmission, the adhesive coating does and it was not necessary, therefore, to use a more moisture vapor-proof type of paper.

For Type "A" Tape the solvents which have the greatest usefulness are the Ketones. These Ketones are blended in accordance with their boiling points to produce the initial as well as the final adhesion comparable to a corresponding tape gummed with animal glue.

The coating of the adhesive is applied continuously on wide Jumbo rolls and is slit to standard widths and lengths.

Type "A" Tape is moistened by using a tape moistening machine. The solvent is poured into the receptacle where water is normally poured and the tape is threaded through the moistening machine, ready for moistening. A moistening machine having a roller type moistening unit with a knurled surface functions perfectly.

The tape is applied at once to the surface to which it is to be adhered. Since Ketone solvents are very volatile, the interval of time during which Type "A" Tape remains properly moistened is limited. Therefore, Type "A" Tape must be applied before the adhesive dries out. Once the adhesive dries out, the tape is useless.

Type "A" Tape provides an instant bond and the unit to which it is sealed can be handled immediately after sealing. However, it takes 5 to 6 hours for the tape to be completely set and before extreme tests can be made.

The tape has a waterproof bond. Tests made have shown that Type "A" Tape is impervious to extremes in temperature ranging as high as 170 deg. Fahr to 70 deg. below Zero Fahr. In fact, Type "A" Tape will usually withstand temperatures lower than that of the materials to which it is applied.

Type "A" Tape is moldproof.

While designed to primarily adhere to such surface as V-1, V-2 and V-3 types of fiber or corrugated cartons, it will also seal to several types of waterproof wrapping paper and bags, wood, metals and other surfaces.

Water submersion tests have proven that Type "A" will remain sealed to the surface to which it is applied for a period of 70 days or longer. In fact Type "A" Tape will usually outlast most materials to which it is applied. Water submersion tests have been stopped after 70 days because it was felt that a test of this length of time would be far beyond any specification requirements.

Type "B" Tape uses as a base two sheets of kraft paper bonded with an asphalt adhesive.

To this moisture impervious paper is applied on one side an Animal Glue adhesive selected to give a maximum water-resistance under the tanning action of a special solvent used to moisten it. Water is not used as a moistening agent, even though the adhesive used is water soluble.

Type "B" Tape adhesive in this respect falls into the same category as the resins used in the formation of high wet strength krafts and for the formation of V-Type boards, in that, in the presence of water, the adhesives do not release, but absorb several times their own weight in water.

The coating of the adhesive is applied continuously on wide Jumbo rolls and is then slit to standard widths and lengths.

The solvent which is used to moisten this adhesive consists of certain protein insolubilizing salts, together with volatile organic tanning agents. The result is to give an immediate action on the tape to produce a waterproof bond as well as to give a progressive tanning effect in connection with the salts which remain permanently in the structure of the glue.

Type "B" Tape is moistened by using a tape moistening machine. A good type of moistening machine, such as one with a roller moistening unit, will work satisfactorily.

Type "B" Tape can be applied at once to the surface to which it is to adhere. Type "B" adhesive will remain moist somewhat longer than Type "A" adhesive. If the adhesive dries out before applying, re-moistening will not have the desired effect inasmuch as the strength of the adhesive will have been changed, due to the original moistening.

A period of 48 hours (termed aging) should elapse between the time of application of Type "B" Tape and the subjugation of the carton or unit to which the tape is sealed for submersion in water.

Type "B" Tape provides an instant bond and the unit to which it is sealed can be handled immediately.

The bond effected by Type "B" Tape

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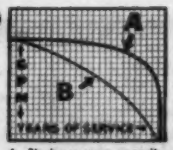

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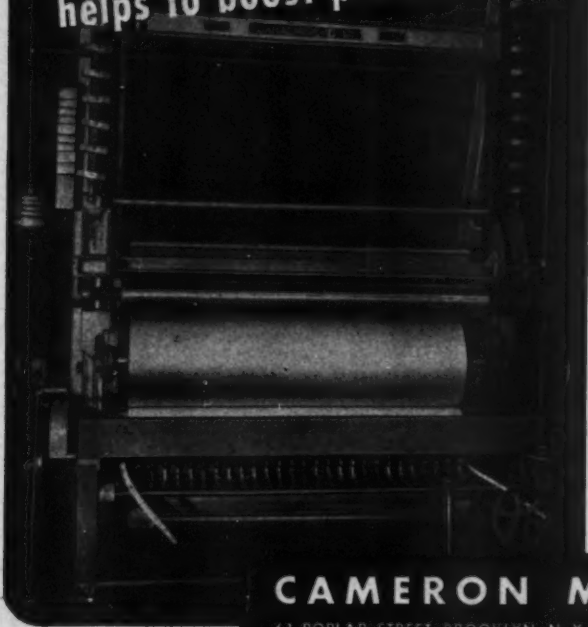

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is one of moisture resistance and cannot be compared with Type "A" Tape, inasmuch as Type "A" Tape gives an absolutely waterproof bond.

Type "B" Tape when submitted to water submersion tests has remained sealed to the surface to which it is applied for periods ranging from 100 hours to well over 120 hours. Since the average specification calls for water submersion tests ranging from 24 to 72 hours, Type "B" Tape is well within the range of necessary requirements.

Temperature tests indicate that Type "B" Tape will withstand temperatures ranging from 400 deg. below Zero Fahr. to 130 deg. above Zero Fahr.

Type "B" Tape will seal best to V-1, V-2 and V-3 types of fiber or corrugated cartons and to many types of waterproof wrappings.

Problems in Packaging War Material

GEORGE A. GARRATT

Head Technologist, Forest Products Laboratory

The packaging of war material for shipment overseas presents problems that are quite distinct from those involved in the peacetime movement of manufactured goods. The wartime shipping program is complicated by the accelerated movement of equipment and supplies in unprecedented volume, both within this country and overseas, by the general inexperience of much of the labor involved and the inefficiency of many handling procedures; and by a variety of other factors. Not the least of the complications is the fact that the manufacturer generally has little or no knowledge of the final destination of the material he is to ship, or of the hazards to which the shipments may be subjected while enroute.

The design and construction of suitable shipping containers and the development of adequate packaging procedures to meet the requirements for the overseas movement of war material and supplies are dependent upon proper evaluation of a variety of factors that may affect not only the serviceability of the containers themselves, but also the ultimate utility of their contents. For the purposes of this discussion, the factors involved will be considered under three headings: (1) handling, transportation, and storage hazards; (2) size and weight restrictions of containers; and (3) the nature of the materials to be shipped, and their need for protection against breakage, corrosion and other forms of damage.

The hazards incident to handling, transportation, and storage are many and varied and may be encountered all along the line, from the point of origin of a shipment to its ultimate destination, be that a storage depot in a hot, arid desert, a base in a steaming, tropical jungle, or a cold, damp Arctic outpost. War material and supplies may be moved by truck, rail, boat, or plane, or even carried on the backs of animals, the shoulders of soldiers and marines, or the heads of native porters. One of the major considerations in the movement of equipment and supplies overseas is the amount of handling and rehandling involved and the resultant damages which may result. It is reliably reported that containers shipped to certain theaters of operation may receive as many as 100 separate handlings between the manufacturer's plant and their final destination.

A consideration of first importance in the handling of material under wartime conditions is the ability of containers and their contents to meet the storage hazards that may be involved. One phase of the general storage problem relates to the stacking qualities of the containers and their ability to protect their contents against superimposed loads, such as are involved in a warehouse where boxes may be piled one on another to a height of 20 feet or more, or in the hold of a ship, where they may be required to help support the weight of crated tractors or other heavy equipment that may be loaded on top of them. An entirely different phase of the problem is concerned with the protection afforded by containers and interior packing methods to contents stored out-of-doors and exposed, often for prolonged periods of time, to the damaging effects of rain and sun, salt atmosphere, and severe changes in temperature and relative humidity. Such exposures are common in theaters of operation, where warehouses have never been built, and in other areas where storage facilities have been largely bombed out of existence.

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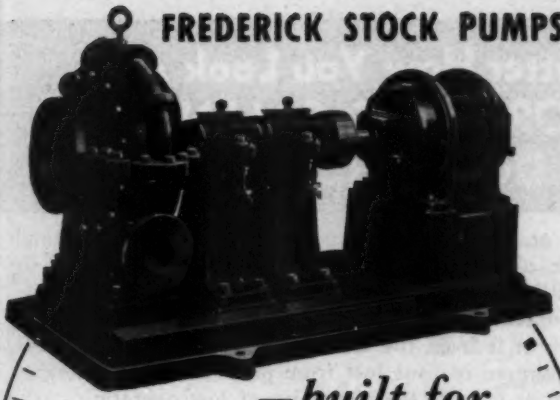

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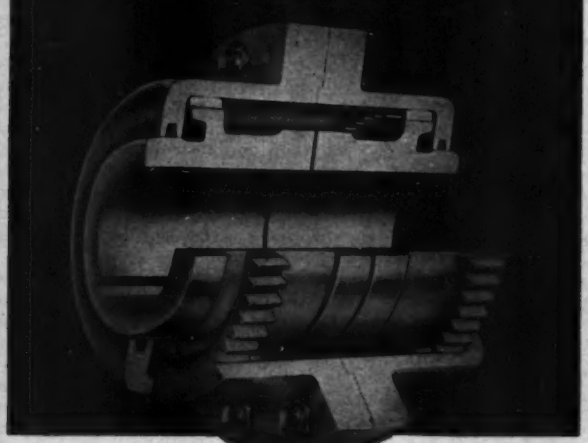

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opment of packaging procedures for protection against the hazards of handling, transportation, and storage is complicated by the variety of stresses involved and the impossibility of analyzing them with any reasonable precision. While applicable engineering principles have naturally been taken into account, the development of containers to meet the requirements of export shipment of war equipment and supplies has been based to a large degree upon empirical, or "trial and error," methods which, despite their recognized shortcomings, have played an important part in the continued improvement in design and construction of boxes and crates.

Much of the real progress in container design and construction has been based on the use of laboratory tests, which have been devised to simulate, at least to some degree, the stresses that may be encountered in actual service. In this type of work, the Forest Products Laboratory has done much pioneering. Thus there have been developed a series of standard procedures, such as the drop, puncture, compression, weaving, conbur, and drum tests, by which it is possible to subject containers to the various types of stress involved in different forms of rough handling and transportation. No one test is capable of supplying all the information required for the proper design of containers, but taken collectively the various procedures are of the utmost value in determining applicable principles and developing rules for the detailed application of these principles in the construction of boxes and crates.

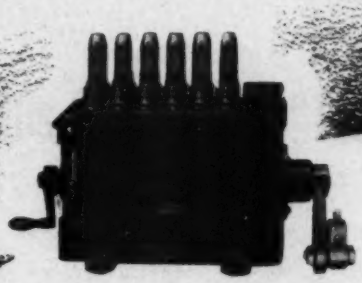
In the development of shipping containers, and particularly those being designed for heavy and bulky items, it is necessary to give some thought to possible restrictions in size and weight which may be imposed because of limitations of the equipment used in handling and in transportation. It is also necessary to consider the structural limitations of the available types of containers in relation to the maximum loads which they can carry with safety under existing shipping conditions.

Cubic displacement of containers is of importance in connection with moving packages by hand and stowing and storing them. Far more significant, however, in connection with both rail and water transportation, is its bearing on the problem of conserving critical shipping space. Marked reductions in cubic displacement are effected by simple disassembly of the items being packaged, by combining two or more items in a single container, by eliminating excessive cushioning and other protective materials within the containers, and by the improved design of containers previously adopted for many items. Added advantages are to be found in the usually resultant saving in packaging material and reduction in weight. It is essential, of course, that disassembly not be carried to the point that subsequent reassembly at destination is too complicated for the men and equipment available to do the job.

Weight restrictions are imposed on containers either because of recognized design limitations, or as the result of requirements for handling the material. The Army-Navy general specifications for packaging and packing for overseas shipment limits the weight of contents packed in nailed-wood and cleated-plywood boxes to 1,000 pounds and that in wirebound boxes to 500 pounds, while corrugated and solid fiberboard boxes are restricted to a maximum gross weight of 70 pounds. Loads in excess of the values indicated for the several types of wood containers are permitted only with the approval of the appropriate procurement officer. Within the indicated maximum weight limits for any type of box, it is important that the individual container be designed for the particular load it will be expected to carry. Underpacking, or overloading, of boxes and crates is one of the most prevalent causes of container failure in service.

Weight limitations are also imposed for the purpose of facilitating handling of containers in storage, during transportation, and in the field of operations. The Army-Navy specifications for export shipment of war material provides that the gross weight of any shipping container shall not exceed 200 pounds, unless the article being packed is too heavy to meet such a restriction. Further limitations have been imposed in the case of tank and automotive spare parts and certain other materials, for which the ideal gross weight of the containers is set at 70 pounds, which is considered to be the maximum load that can be carried by a fully equipped soldier.

Handling requirements may also enter into consideration in connection with the design of crates, because of limitations to



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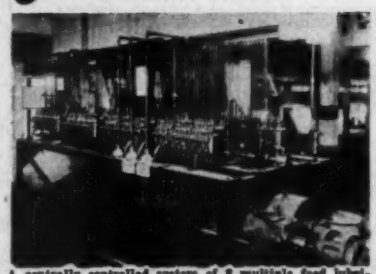

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the loading equipment available on shipboard. Since the handling equipment of the average cargo ship has a maximum capacity of 5 long tons, it is desirable to limit the gross weight of any crate to 11,200 pounds.

The character of the contents themselves will have an important bearing not only on the design and construction of containers, but on the preparation of the material and the detailed interior packing procedures, inasmuch as it will determine the need for protection against breakage, corrosion, or other damage that may necessitate time-consuming maintenance at destination, or even render the contents entirely unfit for service.

The effect on container design of weight, dimensions, shape, construction, and other characteristics of the item or items to be packed is often complex. As far as the various types of shipping box are concerned, however, the interrelationship of these factors has been simplified through the classification of the articles to be packed according to "type of load." Three such types are recognized. In the type 1, or easy load, the material to be packed consists of a single article or package which in itself has sufficient strength and rigidity to withstand ordinary handling and transportation hazards. In such a load, the article or package must fit snugly within the box, so that it will be in contact with and fully support each face of the shipping container. The type 2, or average load, applies to items of moderate density which are either packed directly into the exterior container or are prepared to the extent of being wrapped or placed in interior containers. In either case, the contents must provide support for all faces of the shipping box. The type 3, or difficult load, applies to contents that are of high density or unusual concentration, require a high degree of protection, or do not support the faces of the shipping container. It is obvious that each type of load and, in fact, most individual commodities present their own problems in connection with container design.

Abridgments of papers presented at the annual meeting of *The American Pulp and Paper Mill Superintendents Association*, held in New York City, June 15-17, 1943, appeared consecutively in this section July through September, 1943. The following is the final presentation of papers from that meeting.

The Rubber Crisis

A. C. LUTZ, Industrial Products Sales Div., The B. F. Goodrich Co.

In January, 1942, after bombs had fallen on Pearl Harbor, our nation's plans for large scale synthetic rubber production were largely on paper. True, some synthetic rubber was being produced by privately financed plants. But this production was only a "drop in the bucket" compared to our requirements.

Today, 18 months later, plants are in production having a capacity of 252,000 long tons per year, and by the end of the year, or early in 1944, all of the synthetic plants now planned should be in operation, having a total capacity of 813,000 tons.

Last February, Wm. Jeffers, Rubber Director, estimated that by the end of 1943 we would have a stock pile of only 104,000 tons of rubber of all kinds. Fortunately, through conservation, increased imports of natural rubber and a greater production of synthetic rubber than was anticipated, the end of this year, instead of only 104,000 tons, it is estimated by Mr. Jeffers that we should have on hand 142,000 tons, a more comfortable margin.

A recent sample survey of 55,000 cars driven by war workers showed that 50 per cent of the tires would be worn out by the end of this year. The Public Roads Administration and the War Department's Highway Advisory Committee which conducted this survey foresee a crisis in transportation by the end of 1943 and urge continuation and strengthening of conservation measures.

The rubber industry from its very beginning has been characterized by economic uncertainties, more especially the wide swings in the price of crude rubber. The immense demand of the automobile which began at the turn of the present century carried the price to a high of $3.06 a pound, or over $6000.00 a ton in 1910. The Far

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—if you can't push

PULL!

—if you can't pull

PLEASE GET OUT OF THE WAY!"

—Elbert Hubbard

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East began producing on a large scale and while there was extreme fluctuation, a major downward trend had carried the price to a low of 11½ cents a pound in 1921. In an endeavor to stabilize the price, the British Stevenson plan was put into effect, but despite this, by 1925 the price had risen to $1.20 a pound. In 1928 the Stevenson plan was abandoned and by 1932 prices had tumbled, scraping bottom at 2⅜ cents in New York.

One would think that the law of supply and demand would prevent to some degree this wide fluctuation, but the operation of this basic law never seemed to be a primary factor in the world price of crude rubber.

You have probably heard and will continue to hear many divergent opinions on the future of synthetic rubber, so I would like to give you some of the views of the president of our company, Mr. John L. Collyer, who has devoted a great deal of time and thought to this subject.

It is his belief that the destruction of the Eastern Plantations is not a foregone conclusion, when the Japanese are finally forced to withdraw. These plantations no longer constitute a military weapon, now that the United Nations have an adequate alternate source of rubber. Therefore, the act of destroying the plantations will not have the effect now as it once would have had of seriously crippling the United Nations' ability to fight and win the war, but we all know the Japanese are unpredictable, and what will actually happen is anyone's guess, but it is his opinion that rubber will be grown in the Far East for years and years to come.

If so, the total production of agricultural rubber from all sources in the world after the war will total about 1,700,000 tons. To this amount now add a postwar potential production, about 1,000,000 tons a year of synthetic rubber. This means that the total postwar potential supply of rubber and synthetic rubber would aggregate about 2,700,000 tons, more than twice as much as the world has ever used before. The average yearly world absorption for the three big years, 1939, 1940, and 1941 was approximately 1,100,000 tons. As businessmen you can understandingly see the problems created.

Recently the papers reported the office of Rubber Director Jeffers as mentioning a likelihood of synthetic rubber at 16 cents a pound, but it will take a lower cost than this to eliminate crude rubber on economic grounds. It is reasonable to expect the same striking cost reduction to follow the improvement in the production of synthetic rubber as we have seen take place in numerous other commodities and products.

It seems inevitable that the American people, regardless of a price differential, will want to continue at least stand-by operation in these plants just as they will want to retain airbases and battleships after the war.

It is Mr. Collyer's conviction that the nation's synthetic rubber facilities should be kept intact and in operation on "at least a limited basis of 150,000 to 200,000 tons or more production a year. For only by continued research and actual volume production will the cost of making synthetic rubber approach more nearly the cost of natural rubber."

A certain amount of special purpose synthetic rubber already commercialized by private capital will continue to find a market, because of the superior qualities for scores of specialized uses, gasoline hose for instance. If those responsible for the nation's defense will continue to specify synthetic rubber's use in National Defense equipment in sufficient amounts, this continued operation can be assured.

Copper Plating in the Paper Industry

ROLAND A. PACKARD, Smith Paper, Inc.

The use of critical metal such as copper, brass, stainless steel, Monel metal, aluminum, etc., all of which are extensively used in paper mills throughout the nation makes it necessary for engineering departments in paper mills to be especially resourceful in the matter of conservation and substitution. The use of copper has been reduced about 80 per cent in this industry —the balance is now consumed almost wholly in the manufacture of fourdrinier wires—there being no satisfactory substitute for the phosphor bronze used therein.

Substitution for these critical materials must stand up under dilute acid or alkali conditions on the wet end of any paper manufacturing machinery.

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have the greatest promise was copper plating. Cast iron and steel parts can be satisfactorily plated with copper all the way up to .015 in. in thickness, or even more if it becomes necessary due to some local condition. The small amount of copper required can be obtained from small scrap pieces such as old electric cables or leader pipes which have been worn out—the proportion of which, if retained for this purpose rather than scrap them would be an extremely small amount in comparison to the total copper scrap turned in for the war effort. Such an amount would be so small as to run in the neighborhood of one-tenth to one-hundredth of one per cent of the weight of the parts if made of solid copper or brass.

A copper plating plant has been designed, then constructed out of second-hand equipment.

Bearing housings, rails, dandy roll stands, carrier roll stands as well as breast roll heads have been successfully plated and used. This latter use in an interesting substitution. To eliminate the necessity of inserting new bronze heads in a copper breast roll, the new heads were made of cast iron. They were turned down to a dimension slightly under the diameter of the shell and then plated to a thickness of .015 in., which when forced into the ends of the shell, were ground down to the same diameter as the surface of the shell proper. It has been running for several months in a satisfactory manner.

Many wet end doctors are made of stainless steel. As a substitute, tool steel can be copper plated satisfactorily and prevent subsequent rusting.

Impellers may be plated easily, as well as inside of housings. True enough, erosion from high velocity may wear the copper but at least part of the impeller will stand up a reasonable period of time, after which a new plating job may be done.

Steel bolts and nuts copper plated have turned out successfully. In some cases female threads in frames or nuts have been made oversize to take care of the extra thickness of the male thread of the bolt, as well as allow for plating the inside of the nut where it had become desirable. The contact of the steel of a nut to the copper plated threads of the bolt make it a satisfactory setup which does not seize from rust and make it difficult to remove at a later date. Steel wood screws copper plated have been used extensively in putting together wooden parts of washers and beaters and have shown no deterioration. They are stronger than the brass screws formerly used.

Since galvanized iron pails are a critical product in the war effort, it has been found that old ink pails having a capacity of about eight quarts which were formerly thrown into the scrap can be copper plated as a successful substitution for the large number of galvanized iron pails purchased annually for use in the beater and machine rooms.

In the absence of brass angles and channels, as well as small "I" beams, steel substitutes have been copper plated and have served satisfactorily in the places they have been installed. While not as satisfactory as the brass pieces, they serve as a worthy substitute and should last for a number of years.

A description of the equipment used in this work is not at all complicated, and consists of parts not too difficult to obtain. First of all is a reconditioned low voltage direct current generator good for some 6 to 8 volts, with amperes from 200 to 400.

In the event such a machine is not obtainable, a regular 115 volt, 25, 30 or 50 kw. direct current generator may be used as a substitute, the size depending on how many amperes output are desired. This, in turn, is governed by the area of the largest piece to be plated. The size of the motor in horsepower to be used to drive the generator would be in the neighborhood of fifteen per cent of the original nameplate rating of the generator in kw. However, the shunt field coils of the generator must be replaced by winding up coils in their places having ampere turns and ohms resistance reduced in proportion to the reduction in voltage generated: namely, from 115 to 8. Old wire of greater cross section may be used; but wherever a splice is made it should be brazed. The size of the wire to be used will depend on the space which can be occupied around the pole pieces; keeping in mind the manner of connecting the ultimate field coils in parallel or double parallel to give alternate poles of north, south, north, etc. An auxiliary rheostat may be used to regulate the current flowing in the field which in turn will govern the voltage

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generated in the armature. The series field coils may be replaced unchanged since the normal current from the armature will remain the same.

Should these simple alterations develop unstable operation then a further step may be employed by cutting down the cross section of the iron or steel in the field cores to bring the normal voltage generated nearer the "knee" of the saturation curve. This will involve considerable extra calculation and work in which case the uninitiated should consult an electrical man.

The current density required for satisfactory plating will run anywhere from 10 to 20 amperes per square foot of exposed surface of material to be plated.

The tanks containing the various liquors used for copper plating must of necessity be made of different materials for different solutions. The three tanks used in our installation were constructed with cement bottoms and glazed tile blocks on the sides, cemented together. The cement used in the case of the caustic tank consisted of a sodium silicate base. A similar tank for the cyanide solution employed an acid resisting cement, as well as the tank containing the copper sulphate. The tanks have the following dimensions: 60 in. long x 24 in. wide x 30 in. deep, having a capacity each of about 200 gallons.

Copper bus bars 2 in. x ¼ in. x 72 in. long are satisfactory to support and convey current to and from pieces to be plated. Hardwood blocks to take the bars on edge rest on top of the tile chest walls. In the event these bars cannot be found, smaller copper bars, say 1 in. x ¼ in. may be riveted to 2 in. x 2 in. angle irons with the upper edge of the copper bars protruding above the angle irons.

The article to be plated is cleaned and thoroughly dried to eliminate any loose particles such as foundry sand, gum or dirt. Next, the piece or pieces are inserted into a hot caustic solution which is held at a temperature of 180 Fahr. Formula for this solution is 10 ounces caustic to one gallon of water. The pieces are suspended on copper cables hooked over the + or positive bus bar which conveys current and develops anodes of these parts in order to generate gas bubbles, and as a result, more thoroughly clean the surfaces than would otherwise obtain. This lasts for about ten minutes. The cathode consists of a steel plate in the bottom of the tank; or in the event that a steel plate is used, the shell itself can be the negative connection for the generator. On account of the fumes given off, it is well to have a hood over this tank and a fan connected thereto to expel the obnoxious gases. A wetting agent called Supernal SA may be added to the bath to minimize caustic fumes.

The next step is immersion and inspection of the parts in a tank of hot water, dousing them up and down to assist in the washing away of loose particles and a thorough cleansing from the caustic solution. If any foreign materials remain on the surface, it is essential that they be removed carefully with a steel brush. Under ordinary circumstances, parts do not have to be returned to the caustic solution; but if the foreign materials appear to cling to the parts in certain areas, they should be returned for a longer period.

If it is necessary to return the parts to the hot caustic, they must again be doused in hot water, after which they must pass into an acid pickling bath consisting of one part of hydrochloric acid to two parts of water. This is a so-called pickling process to prepare the surface for the next bath and should remain here about 30 minutes. Temperature of this bath averages 70 Fahr.

Next the parts are again doused in the hot water bath.

The next step is to put the parts into a cyanide bath. This time they should be suspended by the copper wire hooks from the middle or negative bus bar. The two + or positive bus bars should have scrap copper of any kind available distributed opposite to and on both sides of the piece to be plated. The formula for the cyanide solution is as follows:

	Ounces to one gal. water
Copper cyanide	3
Sodium cyanide (86%)	4½
Sodium carbonate	2

The temperature of this bath should run about 100 degrees, which temperature is obtained through a small steam coil in the bath. The duration of this immersion runs about one hour; with two square feet taking double the amperes, three square feet three times the amperes, etc., etc., all calculated on a basis of 15-25 amperes per unit area. This can best be determined by observing carefully the expulsion of gas

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Now, as never before, it is necessary to guard felt life carefully. Every time a mill can, through greater care, "stretch" the life of a top, bottom, or short felt, if only by three days, a lot of wool is saved. Multiplied by the number of paper machines in the United States, the saving in wool would be staggering. Regardless of the mill economies effected, think what that means to Uncle Sam.
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bubbles from the articles to be plated. The desired chemical action taking place over the surface of the pieces is considered normal when a vapor-like appearance of the bath takes place. This, of course, consists of extremely small bubbles of gas; and experience is the best teacher for this particular part of the plating process. The best description is to liken the appearance to vapor coming from a warm steam pipe when sprinkled with water. Care should be exercised not to breathe vapors. Continue this action till piece or pieces take on a copper color.

The next step in the process is the transfer of the parts back to a hot water tank. Again, this is for the purpose of removing all chemicals attached to the surface of the metal from the cyanide bath.

The next step is the copper plating proper. In removing the parts from the hot water bath nothing should touch the surface to be plated but the hook supporting the same, and as soon as all surplus water has dropped from the metal, careful observation should be made of the entire surface to make sure that it is completely covered with a film of water, and that no air comes in contact with any metal. The part or parts should be immersed immediately in the copper sulphate solution. Actually they are suspended from the middle or negative bus bar, and in a manner similar to the cyanide chest where scrap copper pieces are suspended from the two adjacent + bus bars. Apply a current density ranging from 10 to 20 amperes for a duration running from one to fifteen hours, depending on the thickness of copper plate desired. This solution consists of 27 ounces of copper sulphate and 6½ ounces sulphuric acid to the gallon of water. The temperature will run from about 70 to 120 Fahr., depending upon the duration of this part of the process. Much of the rise in temperature comes from the passage of current.

Parts are next immersed in the hot water tank previously used until all traces of chemical solution are removed and the plated pieces hung up to dry. Polishing is done by the usual machine shop method.

The successful manipulation of a copper plating plant depends upon careful attention to a number of things, such as clean parts, and the surfaces maintained in the several conditions described as they pass from one part of the process to another. Care should be exercised to have electrical contacts perfect to prevent local heating due to resistance. Rubber gloves should be used by operatives at all times.

While the copper plating plant herein described has sufficient capacity to take care of the ordinary run of substitution and conservation work around paper mills, problems may arise where intricate or larger articles have to be plated. Under those conditions it will be found advisable to make contact with an established and reliable electro-plating organization. Such concerns are not only willing to give advice on related salvage and maintenance problems but also to furnish electro plating service with other metals such as chromium, nickel, tin and cadmium.

Recognition is given to the Chromium Corporation of America and others for assistance in supplying formulae for the mixing of chemicals, and some of the details in handling the pieces plated.

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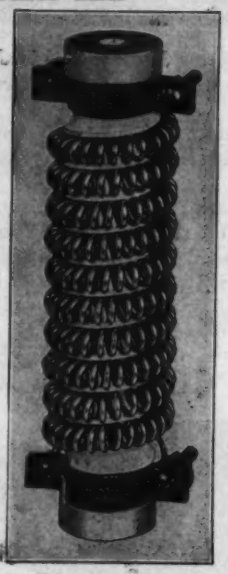
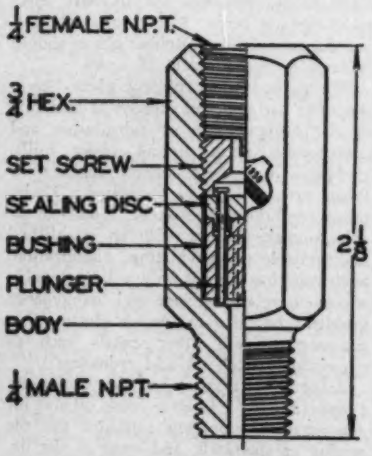


Techtmann Industries, Inc., 828 N. Broadway St., Milwaukee 2, Wis., has announced the Regan Radiant Heater and Resistor. The element consists of a helical coil of nickel-chromium wire wound spirally around a refractory core. The binding posts and straps are of Monel metal or nickel chrome, depending upon requirements. According to the manufacturer, the core will not deteriorate at temperatures up to 1700 Fahr.

The unit is obtainable in a range from 32 to 220 volts.

Pulsation Dampener

The Ashcroft Gauge Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn., has announced a throttling device, the Type 1106 *Ashcroft Pulsation Dampener*, for use with pressure gauges subject to severe pressure pulsations and rapid fluctuations. Good for pressures up to 5000 psi and for any



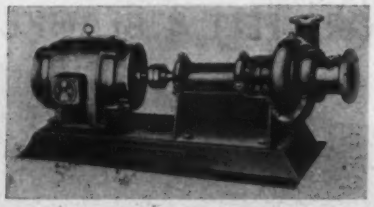
pressure medium such as air, water, oil or steam, the dampener, according to the manufacturer, eliminates excessive or harmful pointer vibration, saves wear on gauge movement, saves time in reading true mean pressure, helps keep gauge in calibration, and prolongs gauge life.

In operation of the dampener, a small Monel plunger oscillates freely in a cylindrical hole in a bushing. The clearance between the plunger and hole is just sufficient to give proper throttling action for certain conditions. The free movement of the plunger makes the device self-cleaning.

Five different size holes are provided in the bushing. The plunger may be transferred from one hole to another, depending upon the degree of dampening required. All holes are sealed off except the one in use by means of a sealing disc.

Paper Stock Pump

Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill., has announced the addition of a closed impeller type of pump to its line of paper stock pumps. This design utilizes the Fairbanks-Morse two-vane, streamlined trash pump impeller, and a volute casing, split along the centerline



of the shaft to permit removal of the entire rotating element, if desired, without disturbing the suction and discharge piping or exposing the bearings.

The impeller design is recommended by the manufacturer for use whenever long fibrous stock or dirty stock containing large solids is to be handled.

New Synthetic Rubber

A new synthetic rubber, known as *Uskol*, has been developed by the General Laboratories of the United States Rubber Company, Rockefeller Center, New York City. According to the announcement, this product offers a new high degree of resistance to solvents; can be vulcanized in several ways to acquire high physical properties; has high tear resistance; can be used alone or as a blend with other synthetics; is more resistant to the effects of sunlight, ozone and oxygen than any other synthetic rubber; and has no odor either in the raw material or in the finished product. Its use will be limited to war products for the duration.

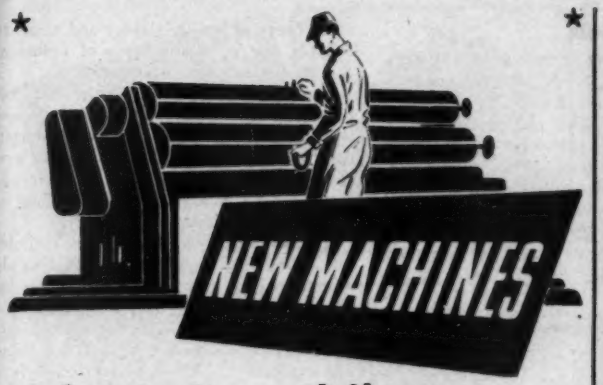
Photo-Copying Unit

American Photocopy Equipment Co., Department 29F, 2849 North Clark Street, Chicago, Ill., has announced a photo-copying unit, designated as APECO, for mak-

ing copies of anything written, typed, printed, or drawn on flat sheet-like surfaces. Consisting of a light-diffusing cabinet with translucent cover, the unit weighs only ten pounds; measures 12 in. by 12 in. by 24 in.; and operates on either ac. or dc. current. The unit is usable on any table or desk. In operation, it reproduces in the same size as original (up to 18 in. by 22 in.) directly from blueprints, drawings, or tracings, letters, business records of all kinds, "paste ups," layouts, magazine clippings, photograph negatives, etc.

Rotary Pumping Units

Two rotary pumping units have been announced by the Blackmer Pump Company, Grand Rapids 9, Mich. One of these pumps has a capacity of 50 gpm at a discharge pressure of 20 psi; the other, 100 gpm at 100 psi. The smaller unit is powered by a 3-hp. motor direct-connected through a flexible coupling; the larger, by a 15-hp. gearhead motor. Both units were developed to handle oils. Other applications are being considered.



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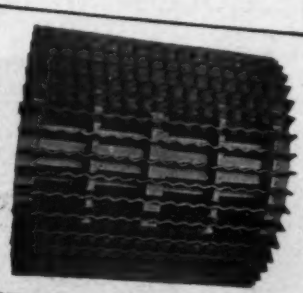

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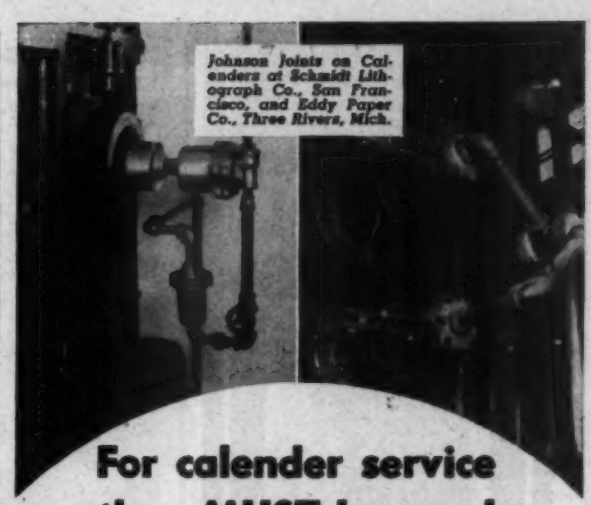


Johnson Joints on Calenders at Schmidt Lithograph Co., San Francisco, and Eddy Paper Co., Three Rivers, Mich.

For calender service they MUST be good

IT takes the tough jobs to show how completely Johnson Joints have outmoded the old stuffing box type of steam fits.

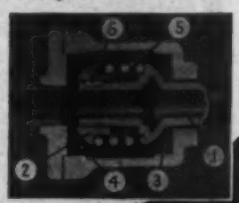
Their outstanding record on calender service is a good example. With the old style stuffing boxes, the lateral shifting of heavy calender rolls causes life-shortening wear of packing and parts—calls for frequent repacking and replacement. But with the Johnson Joint this lateral misalignment is absorbed, without any loss of operating efficiency. An annular space between the nipple and the housing allows the roll to shift in any direction—without impairing the seal—without causing any uneven wear.

This self-aligning feature is only one of the many reasons why more than a hundred paper mills have purchased 50 or more Johnson Joints—why more than fifty mills have purchased from 100 to as many as 800. Its packless, self-oiling, self-adjusting design ends *all* steam fit troubles—cuts maintenance cost—saves valuable production time—offers a simpler, neater way to provide for syphon drainage of rolls.

For Calenders, Paper Machines and Corrugators

Nipple (1), fastened to roll. Sliding collar (2), keyed (6) to nipple. Carbon graphite seal ring (3) and bearing ring (4), which eliminate packing and oiling. Spring (5) is for initial seating only; in operation joint is pressure sealed.

Write for new bulletin



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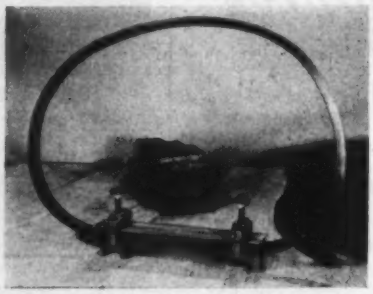
Leather V-Belt

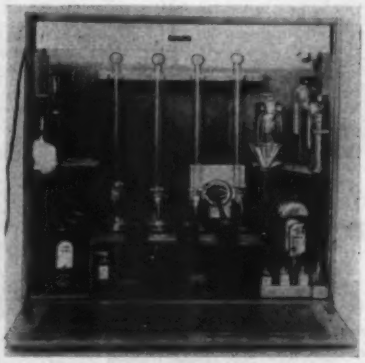
Chas. A. Schieren Company, 30 Ferry Street, New York, N. Y., has announced the development of a leather V-belt (patents applied for). This belt, built up by applying flat leather side walls to a leather core, is supplied in rolls. When a new belt is needed, the predetermined length is cut from a roll of the cross section required and the two ends scarfed through the use of a Schieren mitre box. After scarfing, the ends are fitted in an adjustable-clamp,



cement applied to them and the joining completed. This procedure permits a belt to be installed directly on a drive with outboard bearings wherever such practice is desirable. Some of the advantages of the leather V-belt cited by the manufacturer are: reduces inventory, splices to desired centers, and is salvageable.

Water Testing Equipment

A new test set for boiler water control analyses has been announced by W. H. and L. D. Betz, Gillingham and Worth Sts., Frankford, Philadelphia, Pa. The set includes apparatus and chemicals for the determination of hardness, alkalinity, chloride, sulphite and phosphate. A special cabinet



designed for use on table or wall is provided. All apparatus and chemicals are contained in the cabinet, held in a secure position and ready for instant use. A portion of the opened cabinet door forms a convenient acid-resistant work table and a fluorescent light provides illumination. An instruction book also is included.

Basic Glass Fibers

Owens-Corning Fiberglas Corp., Toledo, Ohio, has announced the availability of seven basic types of glass fibers. The fibers are offered as raw materials for use with other fibers and with plastics and cements, and for use in various types of industrial and chemical process equipment.

According to the announcement, it is believed that the high tensile strength and nonstretching and nonshrinking characteristics of Fiberglas fibers will contribute new and valuable properties to other fiber and textile materials if means can be found to combine economically the raw fibers.

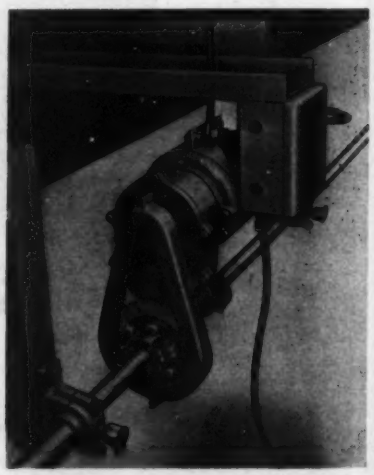
The seven basic glass fibers now available are distinguished by differences in fiber diameter, tensile strength and the glass compositions employed.

Four glass compositions are used to provide different properties required for different applications. These properties, each of which is found in a suitable degree in all the fibers, and to a maximum degree in some, include resistance to acids and weak alkalis, to high temperatures and to severe exposure to weathering.

Owens-Corning will provide limited amounts of each of the basic fibers for experimental purposes and will supply available information regarding these properties, uses and methods of application. It cannot offer exploratory research facilities unless the indicated use would be of military importance or would require quantities of the materials that would warrant such special development work as the company's commitments to the armed forces might permit.

Motorizing Unit for Hand-Traveled Crane

Northern Engineering Works, 2625 Atwater Street, Detroit 7, Mich., has announced *Travelator* for motorizing a hand-traveled crane. The unit is mounted on a channel iron in such a way that it drives



the squaring shaft of the crane through a split sprocket. The sprocket is mounted on a split clamp, so the assembly is applied without removing the squaring shaft.

The only part of the crane that is removed in making the change-over is the hand pull chain. Control of the *Travelator* is through a pendant cord push button which may be arranged to follow the trolley.

The motor is mounted in a steel band, permitting it to be adjusted to any position.

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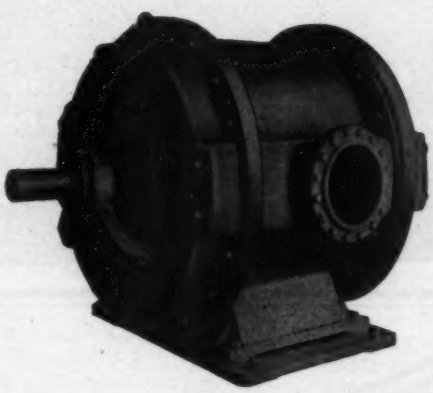

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Testing the Effect of Sizing

Several years ago the authors of the present article described the behavior of paper towards ink (Cf. Papier-Fabr. 37, 97 (1941) abstracted in THE PAPER INDUSTRY AND PAPER WORLD 23, 838 (1941)). Their previous paper is referred to, inasmuch as they now use the same apparatus for determining the degree of sizing. Laboratory conditions for dying test sheets are usually so different from those found in paper mills that serious errors in judgment may arise in gauging the value of a specific sizing agent. Mill conditions for drying have been examined in the case of about 32 different types of paper, and it was found that the time of contact of the paper and the drying cylinders of the paper machine averaged about 30 seconds, whereas older laboratory studies with handsheets often required 12-20 minutes for drying. These wide discrepancies were overcome in the present study, as will be shown.

The following factors were of importance for effective sizing: pH of the beater charge (with an optimum of about 4.5 to 5.0); the temperature maintained in the experimental beater (with 40 deg. C as the optimum); the degree to which the stock was beaten (which varied with different pulps); the order in which alum, size, and fillers were added to the beater. Under the usual manufacturing conditions (simulated in the laboratory), stock density did not have much influence on the test sheets used in the sizing studies. Wet pressing of the test sheet, prior to final drying, is important, and the best conditions were obtained when the water retention of the sheets was 59%.

In some of their drying experiments, the authors used two drying cylinders. The handsheet entered the predryer which was kept at 50 deg. C. until the sheet retained about 50% moisture. The final drying on the second cylinder could be completed at any reasonable temperature up to 120 degrees. The authors also used a single drying cylinder in some of their experiments, in which complete drying was obtained in about 1.5 minutes. When the relative humidity was about 40, and the moisture in the dried handsheet was 4%, the most efficient sizing was noted.

The following stocks were studied under comparable sizing conditions: groundwood (previously beaten to 74 deg. Schopper Riegler), unbleached sulphite (42 deg. S.R.), bleached sulphite (41 deg. S.R.), straw pulp (56 deg. S.R.), aspen pulp (soda ?, 42 deg. S.R.), and cotton rags (70 deg. S.R.). Before sizing, these various pulps showed differences in absorptivity (rise of liquid in test pulp sheets), and, with but few changes, this same order was maintained when the sized handsheets were arranged in order of effective sizing.

In the case of a specific pulp, the degree of beating has an influence on the size retention. For example, a sulphite (bleached) pulp, when beaten to a certain deg. S.R. permitted the use of less size to give an adequately sized sheet. Above 70 deg. S.R., however, more size was required, despite the fact that there was some "auto-sizing" under these conditions. The auto-sizing refers to slime formation (when no external sizing agents are added) which lowers penetration of liquids into the sheet.

Commercial rosin sizes may show very great differences in laboratory tests. The authors examined most of the sizing agents now found in Germany. Of these the rosin sizes were certainly the most effective. Then came the synthetic resin sizes (some of which had been bolstered with smaller amounts of rosin), and finally the montan wax sizing agents which were the least desirable. The poorest of the rosin sizes was considerably better than the best synthetic resin size. W. Brecht and E. Liebert. Papier-Fabr. 41, 9-16; 18-27 (1943).

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Increased Calender Output

The author describes a simple lubricating arrangement (with diagram) which permits the speed of the average calender to be increased considerably. This is important now inasmuch as new calender rolls are not readily available. R. P. Nuki, World's Paper Trade Review, 120, No. 3, 166 and (correction in) No. 5, 270 (July 1943).

Lignosulphonic Acids from Sodium Sulphite Cooks

The question that the authors tried to answer was whether or not lignin in wood is chemically combined with carbohydrate components. Two digestions were made, (a) with crushed spruce wood chips, and (b) with wood shavings. A 12% sodium bisulphite solution was used, and the ratio was 1:5, at a cooking temperature of 130 C. In the case of (a), heating was continued for 15 hours, and the pulp yield was 67.3%, with 1.2% sulphur, 3.12% methoxyl, and a chlorine number of 18.3. In cook (b), the heating was for 12 hours, and the pulp yield was 57%, with 0.9% sulphur, 2.5% methoxyl, and a chlorine number of 10.5. The lignin content could not be determined by the usual Klason method. The waste liquors showed a *p*H of 3.

Using 4, 4'-bis-(dimethylamino diphenylmethane (I) to precipitate a part of the waste liquors, the authors obtained a lignosulphonic acid (II), the composition of which agreed with that of a similar fraction obtained from technical waste liquor. Both before and after hydrolysis this fraction (II) had a very low copper number. There was, however, a low molecular lignosulphonic acid fraction (III) which was not precipitated by (I) and which had a copper number of 5.3 before hydrolysis, showed a copper number of 67.5 after hydrolysis. Evidently hydrolysis is prevented in the cooking liquor, because of the relatively low acidity. The increase in copper number in the case of (III) is not necessarily caused by the hydrolysis of a carbohydrate-lignosulphonic acid complex. It may also result from sulphonated carbohydrates with glycosidic linkages, which are known to be present. The reducing carbohydrates are by no means simple sugars, since a good share of them appear to be removed by basic lead acetate.

The waste liquor from cook (b) [above] was also separated into lignosulphonic acid fractions, by use of (I). The one precipitated by this reagent was similar to II. Besides this, from the mother liquors, two other lignosulphonic acid fractions were isolated by fractional precipitation with brucine, and the brucine salts converted to the corresponding barium salts. Analyses of the latter are given. From the mother liquors of the brucine precipitations, the barium salt of a low molecular weight lignosulphonic acid complex was obtained by precipitation with alcohol. This was also analyzed and was shown to be of the type which has a copper number of 9.1 before, and 72 after hydrolysis. The sulphonic acids obtained with brucine are either contaminated with carbohydrate sulphonic acids or else combined chemically with such acids by glycosidic linkages. H. Erdtmann, P. Ericson, and E. Hägglund. Svensk Papperstidn 46, No. 6, 121 (1943) through B.I.P.C. 13,453 (1943).

Lignin Esters

The production, purification and physical properties of a large number of esters of hardwood alkali lignin are described. In the case of monobasic esters, the acetyl through the stearyl were prepared. In the case of the dibasic esters, the derivatives were those of succinic, adipic, suberic, and azelaic acids. Ordinarily, with the acids of lower molecular weight, penta esters result. With those of intermediate molecular weight, the tetraesters are formed, and with the larger acid molecules, such as palmitic and stearic acids, the triesters result. Generally, too, the melting points of the lignin esters decrease with increasing molecular weight of the acid radicle. The esters are soluble in the following solvents: acetone, chloroform, dioxane and ethyl acetate. With increasing chain length the solubility in ether and petroleum ether increases, whereas solubility in methanol and ethanol decreases. The stearate of alkali lignin is an excellent mold lubricant for wood plastics. It is soluble in drying oils and can be incorporated into paints. H. F. Lewis, F. E. Brauns, M. A. Buchanan, and E. B. Brookbank. Ind. Eng. Chem. 35, No. 10, 1113-7 (1943).

PAPERMAKING PATENTS

IN THE UNITED STATES — Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Treating Bibulous Paper

Patent No. 2,297,698. Richard D. Freeman, Midland, Mich., assigner to The Dow Chemical Company, Midland, Mich., a corporation of Michigan. No drawing. Application July 20, 1940. Serial No. 346,658. 7 Claims. (Cl. 117—103). A method of preparing absorptive paper products of high wet strength which comprises treating a bibulous paper base with a water solution whereof the solute comprises from 5 to 40 parts of a water soluble cellulose ether, from 50 to 95 parts of an urea-formaldehyde resin modified with from 50 to 100 parts of a polyhydric alcohol, drying the so-called paper and heating the paper to a temperature of approximately 90° to 120° C. to set the polyhydric alcohol-modified resin.

Paper Manufacture

Patent No. 2,299,460. Henri G. Chatain and Herbert L. Dyer, Jr., Erie, Pa., assignors to Hammermill Paper Company, Erie, Pa., a corporation of Pennsylvania. Application March 16, 1940. Serial No. 324,284. 8 Claims. (Cl. 34—18). The method of drying paper in the dryer section of a paper machine in which the paper is passed over a series of dryer rolls, said method comprising pressing one side of the paper sheet against the surface of a dryer roll during its passage thereover by contacting the other side of said paper sheet with a flexible band; removing said band from contact with said paper by passing said band over an element adjacent to said dryer roll thereby exposing a surface of said paper; returning said band into contact with said paper while said paper is still in intimate contact with said dryer rolls; and directing an air current on to said exposed surface of said paper.

Chemical Recovery System for Pulp Mills

Patent No. 2,303,811. John Phillips Badenhausen, Philadelphia, Pa., assignor of one-half to Day and Zimmermann, Incorporated, Philadelphia, Pa., a corporation of Maryland. Application January 9, 1940. Serial No. 313,143. 1 Claim. (Cl. 23—262). Apparatus for treating waste liquor from industrial processes which includes a chemical recovery furnace in which the combustible constituents of the waste liquor are burned, and means constructed and arranged to bring waste liquor and the exhaust combustion gases from the furnace into contact for the collecting of chemicals carried over from said furnace and for concentrating the waste liquor, said means including a plurality of contact compartments disposed one above another in parallel to the flow of gas with an exhaust gas inlet at the bottom and a gas outlet at the top, each of said compartments being provided with packings having a large surface area and a large ratio of free space, connections for delivering said exhaust gases to each of said compartments for upward movement therethrough, spray devices for spraying waste liquor downwardly into each of said compartments and for contact with the exhaust gases, and said compartments being separated by inclined intermediate partition walls, the portions of each partition wall facing towards a compartment thereabove collecting and delivering downwardly concentrated residual material from that compartment and the portions of each partition wall facing toward a compartment therebelow directing the gases passing from that compartment.

Method of Making Sulphite Pulp

Patent No. 2,305,493. Donald C. Porter, Appleton, and Walter H. Swanson, Menasha, Wis., assignors to Paper Patents Company, Neenah, Wis., a corporation of Wisconsin. Application September 19, 1940. Serial No. 357,358. 6 Claims. (Cl. 92—11). In the process of making sul-

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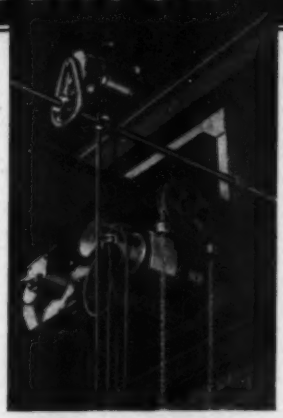
THE Northern "TRAVELATOR"



Less than half a day required for application—no dismantling of crane—any good mechanic can apply the Northern "Travelator."

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phite pulp, the method of substantially reducing the normal drop in liquor circulation during the blowing down of a digester which comprises reducing the pressure in an interrupted stepwise manner.

Art of Coating Paper

Patent No. 2,304,819. William F. Grupe, Lyndhurst, N. J., assignor to John R. Ditmars, New Brunswick, N. J. Application June 18, 1940. Serial No. 341,165. 6 Claims. (Cl. 91—55). A method of successively molding aqueous mineral coatings applied to opposite sides of a web which coatings are in substantially non-plastic condition, comprising the steps of moistening the exposed surface of one coating to render it semi-plastic, then subjecting the surface of the semi-plastic coating to pressure contact with a heated finishing surface to mold the engaged coating while the coating on the opposite web side remains substantially non-plastic, moistening the exposed surface of the coating last named to restore thereto some of the moisture content thereof yielded during molding of the first named coating to render the second named coating readily receptive to moisture, thereafter again moistening the exposed surface of the second named coating to render it semi-plastic, and then subjecting the exposed surface of the second named coating to pressure contact with a heated finishing surface to mold the second named coating before its added moisture content penetrates to the first named molded coating.

In a machine for operating upon a traveling paper web having an aqueous mineral non-plastic coating on each side thereof, means for moistening the coating on one side of the web to render it semi-plastic, a heated finishing drum adjacent said moistening means for molding said semi-plastic coating, means spaced from said drum in the direction of travel of the web for restoring moisture to the coating on the other side of the web yielded during molding of the first coating, means spaced from the moisture restoring means in the direction of travel of the web for moistening the second coating to render it semi-plastic, and a second heated finishing drum adjacent said last moistening means for molding the second coating.

Pulp Screen and Washer

Patent No. 2,312,675. Carl Scheiding, Middletown, Ohio, assignor of one-half to F. C. Zart, Cincinnati, Ohio. Application December 8, 1939, Serial No. 308,275. 3 Claims. (Cl. 92—32). 3. An individual screening unit adapted to be used in a pulp screen and washer of the character described which comprises a boxlike body, a foraminous flat top for said body, a deformable strip on one longer edge of said foraminous top, a flexible bottom, a stiff plate centrally attached to said flexible bottom, a roller leg extending downwardly from said stiff plate, a spring mounting for said roller leg, a discharge spout at the lowest point of said flexible bottom, a deflector plate adapted to cooperate with said discharge spout to provide a liquid seal, said discharge spout having also in its region where the liquid seal is provided, a small by-pass opening, and attached to the ends of said boxlike body of the screening unit, two stepped shafts protruding from each of the ends of said body, the ends of said shafts being adapted to function as the ling studs of a roller chain.

Sizing of Paper

Patent No. 2,315,675. Ernst Trommsdorff, Darmstadt, Germany, assignor to Röhm & Haas Company, Philadelphia, Pa. No Drawing. Application August 15, 1940. Serial No. 352,741. In Germany August 25, 1939. 3 Claims. (Cl. 92—21). 2. In the process of beater-sizing with resins and waxes, a paper made from cellulose pulp, the improvement which comprises adding to the pulp, prior to the formation of a web therefrom, about 0.3% to about 0.5% of a water-soluble salt of a copolymer of which methacrylic acid is the predominating component, the amount of said salt being calculated on the weight of the cellulose content of said pulp.

Coated Paper

Patent No. 2,292,518. John Helfrich, Westfield, N. J. No Drawing. Application March 11, 1939. Serial No. 261,310. 1 Claim. (Cl. 117—158). Paper having a fusible and flexible and water-impermeable and water-free coating, said coating comprising substantially 40-75 parts of a neutral resin, 3-15 parts of diamyl phthalate, 5-25 parts of paraffin wax, and the reaction product of ½ part to 2 parts of magnesium oxide and 5-15 parts of dammar gun, said proportions being by weight.

New Catalogues and Publications

Allis Chalmers Mfg. Co., Milwaukee, Wis.—The new pocket-sized magazine "Operation and Maintenance Review," which supersedes "Victory Production and Maintenance News," is designed to broaden interest in problems of wartime maintenance. It contains tips from Allis-Chalmers engineers, as well as articles on current trends for the shopman and the executive, and invites an exchange of ideas on operation and maintenance from equipment users. An illustrated 16-page booklet, B-6285, "Packaging Pays Off" describes standardized load center unit substations, and details the various functions of the system, the variety of incoming arrangements and its construction features. Pointed out in this bulletin as advantages of the new load center power distribution system are quicker delivery of equipment, easier installation, critical material saving, and lower initial cost.

American Standards Association, 29 W. 39th St., New York 18, N. Y.—Announces the publication of its new list of standards. More than 600 are listed, 64 of which have been approved or revised since the printing of the last price list in April, 1943. Specifications for materials, methods of tests, dimensions, definitions of technical terms, procedures, etc., are covered, and the new list also includes 95 safety engineering standards. Copies from the Association.

Bulkley, Dunton Pulp Company, Inc., New York—This company has just issued the first edition of a new publication called "Pulp and Paper Bulletin," which offers a highly condensed resume of the more important news items in the pulp, paper and board industry. This bulletin will review timely topics and news happenings published in trade journals, and is designed to bring to the attention of the busy reader those worthwhile items which frequently pass unnoticed. It includes a book review section and news from abroad. Printed with a touch of color and illustrated, it is easy to read and timely.

Chain Belt Company, Milwaukee, Wis.—Bulletin No. 433 is a 20-page descriptive catalogue dealing with the mechanical parts, construction and operation of Rex Speed Prime Pumps. The pumping capacities and specifications of each model are covered, and illustrations highlight types and sizes of pumps for every purpose. Write for free copies.

Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y.—A new catalog of technical books lists the latest books on chemistry, technology, physics, general science, mathematics, engineering, radio, aviation, foods, formularies, cosmetics, gardening, medicine, metals, technical dictionaries, etc. It gives the date of publication of each book, as well as a concise description and full table of contents. Copies gratis.

Cochrane Corporation, 17th & Allegheny Ave., Philadelphia 32, Pa.—Reprint 29 entitled "Flow Meter Engineering," a 16-page booklet by Wm. C. Bennett of the company's staff tells why, when and where flow meters and instruments are used in modern plants. Two facing pages contain a considerable amount of basic metering data, and other pages depict drawings devoted to proper installation details. Helpful, too, are the hints on keeping instruments out of the repair shop. Write for copy.

E. I. du Pont de Nemours & Company (Cellophane Technical Section), Wilmington, Del.—Just off the press is a "Military Parts Packaging Chart" which summarizes Government requirements for packaging military machinery and parts. It is based on packaging specifications issued by the Ordnance Corps, Engineering Corps and Air Corps, as well as those used jointly by the Army and Navy, and lists the properties and construction of grades A, B and C wrapping materials, including cellophane and laminated sheeting, together with the three strength types under each grade. Specified methods of packaging are outlined, and under each method are given a number of typical parts for which the method is employed. Copies available.

The Eimco Corporation, 634 South 4th West Street, Salt Lake City, Utah—Bulletin F-2002 is a 48-page illustrated catalogue covering the company's complete line of continuous vacuum filters and dryers. There are six pages of diagrammatic installation drawings, and information concerning the use of the equipment in industries having dewatering or filtering problems. One section of the catalogue is devoted to the application of Eimco filters for the paper industry. Under the section devoted to accessory equipment, space is given to repulpers, agitators, thickeners, etc. Copies on request.

Greene, Tweed & Company, New York—Into a 4-page bulletin entitled "G-T Packaging" is condensed much valuable information relative to the correct meth-

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ods of packing liquids, gas and vapor. More than three dozen different fluids commonly handled in processing work and general plant service are alphabetically tabled, and the proper packaging of each in conformity with its size and weight. Available on request.

National Lumber Manufacturers Association, Washington, D. C.—Compiled by the Statistical Division, this third biennial edition of *Lumber Industry Facts* presents important information relative to our forest industries. In this 60-page brochure are pertinent facts and figures about the forest itself, lumber and timber products, production and consumption; pulpwood, pulp and paper. It contains 78 statistical tables and charts, and a chapter on the forestry situation reviews pertinent legislation. The objectives, activities, officers, and membership of the National Lumber Manufacturers' Association are also included. This publication may be secured by addressing Statistical Division, Lumber Manufacturers' Association, 1319 18th St. N.W., Washington, D. C.

Pyrene Mfg. Co., Newark, N. J.—A folder entitled "A First Aid Course in Fire Protection" covers various types of fire extinguishers. The Phomaire conversion unit, which converts a pump tank into a foam extinguisher, is described, and a chart sets forth the various types of extinguishers available for fire hazards under all industrial conditions. Copies available.

R. S. Products Corporation, Philadelphia, 44, Pa.—A new 36-page catalogue describes a complete line of butterfly valves and is profusely illustrated with both manual and power operated valves for pressures ranging from 15 to 900 psi. It contains detailed specifications, applications and descriptions of new type valves. The last pages contain various tables covering sizes and dimensions. Ask for catalogue 14-B.

Whiting Corporation, Harvey, Ill.—Has recently issued three 2-page bulletins. FY-125 describes the application and advantages of the Hydro-clone grinding, burring and polishing bench. FY-126 covers type "SH" Hydro-clone dust supressor. FY-127 outlines type "R" Hydro-clone dust supressor. Details of construction, operation and dimension of these various units are presented. Copies gratis.

Worner Electronic Devices, Chicago, 22, Ill.—This company's electronic devices for controlling various types of equipment are described in bulletin 9143. The application of these units for industrial and safety control is outlined; and the bulletin is illustrated and written in nontechnical language.

Yarnall-Waring Company, Philadelphia, 18, Pa.—Three new bulletins have been issued. T-1738 describes steam traps for power plants, steam distribution systems, industrial steam processes and marine service; G-1306 details boiler blow-off valves, water columns and gages, expansion joints, steam traps and strainers, spray nozzles and liquid level indicators; and EI-1909 covers expansion joints. Copies available.

Books

Principles and Practices of Flow Meter Engineering—This handbook by L. K. Spink is now in its sixth edition. The sixth edition is a volume of approximately 230 pages. It is well illustrated with photographs and diagrams; and contains many tables and formulae for use in ordinary liquid or gas flow computations. Divided into two major parts, Part I treats of liquid flow measurement; Part II, gas flow measurement. Bound in a black, semi-flexible cover with overprinting in gold, the book is priced at $3.00 a copy by The Foxboro Company, Foxboro, Mass., the publisher.

Statistical Abstract of the United States (1942)—This annual volume (the 64th issue) is a compilation of statistics relating to the social and economic condition of the population and to the industrial, commercial, and governmental activities of the Nation. The statistical tables contained in the Abstract are compilations of data collected by the various statistical agencies of the Federal Government, by several state agencies, and by a considerable number of nongovernmental organizations. It is a volume of more than 1,100 pages, bound in buckram. Available through the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., the price of the book is $1.75 a copy.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.—Consumer demand for information on wartime lighting has resulted in the issuance of a 175-page "Lighting Handbook" originally scheduled for release after the War. Designed as a practical guide and working reference for lighting engineers, designers, architects and builders, it includes charts which provide methods of quickly calculating the number and size of lamps needed for practically every type of lighting fixture. The edition of this case-bound, leatherette covered handbook is limited. Price $1.00 per copy from the company or its district offices.

CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

OPA ceiling prices in sales to consuming mills delivered buyer's usual receiving point, with brokers' allowance not in excess of 5 per cent.

	per cwt.
Blue Overalls	-5.50
Corduroy, Men's	-3.50
Corduroy, Ladies'	-3.00
Washables, No. 1	-3.00
Percales	-4.75
New Soft Blacks	-3.75
Light Prints, No. 1	-4.50
Khaki Cuttings—	
Bleachable	-4.25
Unbleachable	-3.50
New White Canvas	-6.50
New Mixed Blacks	-3.25
Canton Flannels, Bleached	-7.00
Shirt Cuttings—	
New White No. 1	-7.25
No. 1 White Headings	-7.25
White Shrunk	-5.00
Silesias No. 1	-5.75
New Unbleached	-7.50
Fancy	-3.50
Linen Cuttings—	
American	-5.00
White	-14.00
Grey	-14.00

RAGS (Domestic)

f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f. o. b. cars at points of shipment, with brokers' allowances of $1 to $2 a ton depending on the value of the grade involved.

Roofing—	per ton
No. 1	31.00
No. 2	29.00
No. 3 and No. 4	27.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
Whites, No. 2—	
Repacked	58.00
Miscellaneous	53.00

RAGS (Foreign)

ex dock New York City

NEW RAGS — per cwt. — Nominal

New Dark Cuttings
New Mixed Cuttings
New Light Silesias
Light Flannelettes
Unbleached Cuttings
New White Cuttings
New Light Oxfords
New Light Prints

RAGS (Foreign)

ex dock New York City

OLD RAGS — per cwt. — Nominal

No. 1 White Linens
No. 2 White Linens
No. 3 White Linens
No. 4 White Linens
No. 1 White Cottons
No. 2 White Cottons
No. 3 White Cottons
No. 4 White Cottons
Extra Light Prints
Ord. Light Prints
Med. Light Prints
Dutch Blue Cottons
French Blue Cottons
French Blue Linens
Checks and Blues
Linsey Garments
Dark Cottons
Old Shopperies

ROPE and BAGGING

f. o. b. and ex dock New York City

Gunny No. 1—	per cwt.
Foreign	Nominal
Domestic	3.25 to 3.50
Wool Tares—	per cwt.
Light	3.50 to 3.75
Heavy	3.75 to 4.00
No. 1 Scrap Bagging	3.00 to 3.25
Manila Rope—	
No. 1 large	-*115.00
No. 1 small	-*105.00
Sisal Rope—	
No. 1 large	-*95.00
No. 1 small	-*80.00
New Burlap Cuttings	5.50 to 5.75
Jute Threads—	
Foreign (Nom.)	6.25 to 6.75
Domestic	5.50 to 6.00
Strings—	
No. 1 sisal	-*80.00
No. 2 sisal	-*60.00
Soft Jute	5.25 to 5.50
Mixed	1.50 to 1.75

*OPA ceiling price per ton f. o. b. shipping point.

WASTE PAPER

OPA ceiling prices f. o. b. points of shipment, with brokers' allowance of 4 to 9 per cent.

Shavings—	per ton
White Env. Cuts, One-Cut	67.50-
Hard White Env. Cuts	62.50-
Hard White, Unruled	57.50-
Soft White, No. 1	50.00-
Soft White, One-Cut	57.50-
Soft White, Misc.	43.00-
Fly Leaf, No. 1	32.50-
Fly Leaf, Woody, No. 1	25.00-
No. 2 Mixed Col. Woody	18.00-
Flat Stock—	
Repacked No. 1 Heavy Books and Magazines	33.50-
Mixed Books	17.00-
Ledger Stock—	
No. 1 White	43.50-
No. 1 Mixed (Colored)	37.50-
Manilas—	
New Env. Cuttings	53.00-
New Env. Cuts, One-Cut	57.50-
Extra Manilas	37.00-
Manila Tab Cards, Free of Ground Wood	45.00-
Ground Wood Manila Tab Cards	27.00-
Kraft—	
Envelope Cuttings	65.00-
Mixed Env. or Bag Cuts	55.00-
Tripled Sorted No. 1 Brown	50.00-
New 100% Cor. Cuts	45.00-
No. 1 Old Assorted	35.00-
News—	
White Blank	33.00-
Overissue	17.00-
No. 1 Baled	15.00-
Old Corrugated Containers	23.00
New Corrugated Cuts	18.00-
Mill Wrappers	17.00-
Box Board Chips	14.50-
No. 1 Mixed Paper	14.00-

CHEMICALS

f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25-
Ground, cwt.	4.00-
Powdered, cwt.	4.40-
Blanc Fixe—	
Pulp, bulk, ton	40.00 to 46.50
Dry, barrels, pound	60.00 to -
Bleaching Powder—	
Drums, cwt.	2.25 to 2.10
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	24.00 to 24.75
80-100 mesh (bags), lb.	—
Argentine, lb.	—
China Clay—	
Domestic Filler Bulk (mine) ton	7.50 to 15.00
Domestic Coating Bulk (mine) ton	12.00 to 22.00
Imported (ship side) Bulk (lump) ton	15.00 to 26.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	.90 to .95
Glyc. (C.P.) drums, lb.	18.25 to 18.50
Litharge, powd., bbl., lb.	.09 to -
Rosin (Gum)—	
New York, per 100 lbs.	
E	4.63-
F	4.64-
G	4.67-
WW	7.50-
Rosin (Wood), carlots	3.94-
Salt Cake—	
Dom. bulk (wks) ton	15.00 to 16.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	20.00 to
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.30 -
Ground and flake, drums, cwt.	2.70 -
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.10-
Pearl, barrels, cwt.	3.20-
Paper (Sp.) bags, cwt.	3.20-
barrels, cwt.	3.30-
Sulphur (crude)—	
(mine) bulk, long ton	16.00 to 20.50
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 21.00
Imp. bulk, ton (Nom.)	—
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05¾ to .06
Calcium Pig., bbls., lb.	.05 to .05¾
Zinc Sulphide, bbls., lb.	.5.60 to 5.85

WOOD PULP

OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo.:

Bleached softwood sulphite	76.00
Unbleached softwood sulphite	66.00
Bleached hardwood sulphite	73.50
Unbleached hardwood sulphite	63.50
Bleached Mitscherlich sulphite	81.00
Unbleached Mitscherlich sulphite	72.00
Northern bleached sulphate	86.00
Southern bleached sulphate	79.00
Northern semi-bleached sulphate	82.00
Southern semi-bleached sulphate	75.00
Northern unbleached sulphate	73.00
Southern unbleached sulphate	63.50
Bleached soda pulp	66.00
Unbleached soda pulp	62.00
Ground wood pulp	46.00
Sulphite screenings	38.50
Sulphate screenings	38.00
Ground wood screenings	30.00
Northern unbleached sulphate siderums	73.00
Southern unbleached sulphate siderums	63.50
Standard news print siderums	46.00

PAPER

f. o. b. New York City

Boards—	per ton
Binders	84.00-
Chip	48.00-
Chip, sgl. mla. lined	60.00-
Coated, white patent .016	80.00-
.020 and heavier	75.00-
Kraft liner	62.00-
News	48.00-

Book Papers—OPA base maximum prices per cwt. 4 cases or equivalent, f. o. b. mill with quantity, weight, manufacturing and other differentials allowed:

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	8.25
B Grade E. F.	7.80
C Grade E. F.	7.55
D Grade E. F.	7.30
E Grade E. F.	7.05
No. 2 Uncoated Offset 4 sides. White	8.45
Coated White (Trimmed 4 sides)	
No. 1 Glossy	11.90
No. 2 Glossy	10.85
No. 3 Glossy	10.15
No. 4 Glossy	9.80
No 5 Glossy	9.30
C2S Offset	10.40
C1S Litho (Varnish)	10.05
C1S Litho (Non-Varnish)	9.80

Writing Papers—OPA base maximum prices per cwt. on writing papers, f. o. b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—	per cwt. 20 lb.	16 lb.
Extra 100% Rag	34.00	34.00
100% Rag	28.00	28.00
75% Rag	20.00	20.00
50% Rag	16.00	17.25
25% Rag	14.00	15.00

Rag Content Ledger—	per cwt. Zone 1
Extra 100% Rag	35.00
100% Rag	29.00
85% Rag	26.00
75% Rag	21.00
50% Rag	17.50
25% Rag	15.00

Sulphite Bond—	per cwt. 20 lb.	16 lb.
Air dry, watermarked	12.75	13.70
No. 1 (M. F.) watermarked	9.00	9.70
No. 2 (M. F.) watermarked	8.25	8.85
Plain (M. F.) unwatermarked	7.60	8.20

Sulphite Ledger—	per cwt. Zone 1
No. 1 (M. F.) watermarked	10.00
No. 2 (M. F.) watermarked	9.25
Plain (M. F.) unwatermarked	8.60

Glassine (f. o. b. mill)—	per cwt.
Embossed (25 lb. up)	13.75 to 14.25
Bleached (25 lb. up)	12.75 to 13.25
Unbleach. (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleach. (25 lb. up)	11.00 to 11.50
Unbleach. (25 lb. up)	10.00 to 10.50

News—OPA Ceilings	per ton
Rolls (Contract)	58.00
Rolls (Spot)	(nominal)
Sheets	66.00

Tissues (Carlots)—	per ream
White, No. 1	1.12½ to 1.20
White, No. 2	1.00-
Bleached Anti-Tarnish	1.15-
Colored	—
Anti-Tarnish Kraft	.70-
Manila	.90 to .93
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.60-
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.60-
Toilet, Bleached (M shts.) per cs.	5.65-
Toilet, Unbleached (M shts.) per cs.	4.25-

Towels—	per cases
Bleached	3.20 to 3.75
Unbleached	2.60 to 3.05

Wrappings (Kraft)—	per cwt.
Super-Standard	5.25-
No. 1 Wrapping	5.00-
Standard Wrapping	4.75-
Standard Bag	4.37½-

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)

Bleached papers—	per cwt.
M.F. & M.G. Waxing, 20 lb. (Carloads only)	7.25 to 7.50
(10,000 lbs.)	7.50 to 7.75
Drug wrapp. 35 lb.	7.00 to 7.25
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	5.50 to 5.75
No. 1 Butchers	5.75 to 6.00
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	6.25 to 6.50
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	6.00 to 6.25
Steam Finish, 50 lb.	5.00 to 5.25
Water Finish, 40 lb.	5.50 to 5.75

Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	6.00 to 6.50
Envp. Mla., Sub. 16-28 (No. 2)	5.75 to 6.00
Envp. Mla. (Prices based on large sheets untrim'd reammarked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	6.00 to 6.25
No. 2	5.75 to 6.00

M. G. Sulphite and Kraft (other than Waxing)	
Grade A-22 lb.	7.20 to 7.40
Grade B-30 lb.	6.75 to 7.00

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To operate your mill at peak efficiency, equipment must be kept in tip-top condition. The NEW, THIRD EDITION of this 28-page Oakite manual contains short cuts for QUICKLY, EASILY handling such important jobs as:

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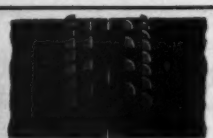

Reverse side of belt, showing hooks driven through and ready to be clinched.

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Official U. S. Signal Corps Photo

THEY'VE got a tough job ahead of them as they step out on this enemy beach. But we know they'll give 'em the works. And we'll give everything we've got back home, too—we'll work overtime without kicking, we'll go easy on gas and tires . . . and we'll buy War Bonds with every extra dollar.

They are risking their lives . . . and we *must* do *our* part.

THE GARLOCK PACKING COMPANY, PALMYRA, N. Y.

Manufacturers of GARLOCK Packings, Gaskets and KLOZURE Oil Seals

In Canada: The Garlock Packing Company of Canada Ltd., Montreal, Que.

GARLOCK

PRODUCTION *MOUNTS!*

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